October 1984
Vol. 10 No. 10
$2.95

COMPUTERS IN EDUCATION

creative computing®

the #1 magazine of computer applications and software

In-Depth Evaluations:

- Epson PX-8 Notebook Computer
- Apple IIc
- Acorn Computer
- Havac Computer
- IBM Keyboards
- Software For Preschoolers
- 25 Math Education Packages
- Human Edge Software

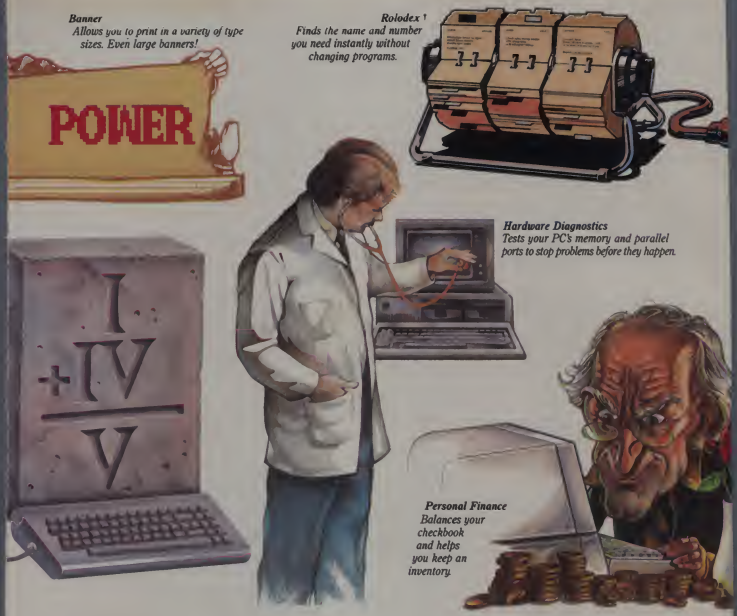
Special Section: Choosing And Using Integrated Software

Computers In Special Education

Software Designers Speak Out

Structured Programming In Basic

A Calculus Game


Banner
Allows you to print in a variety of type sizes. Even large banners!
POWER
Roiodex †
Finds the name and number you need instantly without changing programs.
Hardware Diagnostics
Tests your PC's memory and parallel ports to stop problems before they happen.
I
+IV
V
Personal Finance
Balances your checkbook and helps you keep an inventory.

should do all of the above.

Free Software *"...a chest of Jewels."—PC Week*
Great hardware deserves great software. So, if you buy a Tecmar board we'll give you our Treasure Chest™ of Software at no extra charge. The Treasure Chest consists of 24 programs that include business applications, a calculator, a security system, hardware diagnostics, even games! Most of these can be run in background mode with programs like Lotus 1-2-3 and WordStar. Using these features is as easy as a couple of keystrokes, and without changing disks. No other company offers you such an extensive array of software with their multifunction boards.

So, ask your dealer for a demonstration of any of Tecmar's multifunction boards. And check out the free software while you're there. Or call 216-349-0600 for the dealer nearest you.

Tecmar
THE POWER BEHIND THE PC

†Lotus 1-2-3 is a registered trademark of the Lotus Development Corporation
†Roiodex is a registered trademark of the Roiodex Corporation ††WordStar is a registered trademark of the MicroPro International Corporation

CIRCLE 205 ON READER SERVICE CARD

Clock/Calendar
Automatically inserts the date and time when you turn on your computer.

Encode/Decode
Ensures the security of your files.

Appointment Reminder
Lets you know where to be and when.

Personalized form letters
Uses your file to personalize your letters and make labels.

Calculator
Does your figuring in background mode so you won't have to change programs.

Memo
Writes memos and keeps a written record of each one.

Tecmar thinks your PC

As your business grows, so should your computer. Only Tecmar offers you this unique package of hardware and free software. With it your PC can grow to its full potential.

Tecmar Multifunction Boards...

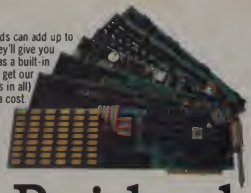
"extremely powerful."— PC World

A Tecmar board will expand your computer's memory and increase its speed and efficiency. It will give you additional ports to accommodate a wide range of peripherals from modems and plotters to dot matrix and letter quality printers.

With a Tecmar board you can run powerful programs like Lotus 1-2-3™* and WordStar®†† on a PCjr. The RamSpooler makes printing a background task and frees your PC for other jobs. A built-in clock/calendar automatically inserts the date and time at power on and is independently powered by an easily replaced battery.

Every Tecmar multifunction board is run through a series of rigorous tests to ensure quality. Our incredibly low failure rate (0.4%) is unparalleled. All boards are additionally backed by a full one-year warranty.

Our Captain™ or other multifunction boards can add up to 384K bytes of memory to your IBM PC. They'll give you additional serial and parallel ports as well as a built-in clock/calendar. With each board, you'll get our Treasure Chest™ of Software (24 programs in all) at no extra cost.



Tecmar's Lab Master™ is ideal for process control and the tracking of laboratory experiments in industrial and scientific applications. It converts analog data to digital data, and back again. Sophisticated timing is accomplished throughout this process by Lab Master's timer/counter circuitry (AMD 9513). The Lab Master has 24 digital I/O lines. 12-bit resolution is standard while 14- or 16-bit resolution is optional. Additional A/D and D/A channels are also available.

For your graphics needs, Tecmar offers the Graphics Master™ With it, your PC gets graphics support for most popular software packages like Lotus 1-2-3,™ Open Access,™ Auto CAD,™ and all IBM color software. Graphics Master works in high resolution color (640 x 400) or Monochrome (720 x 700).

Peripheral Vision

When your computer needs peripherals, it pays to go with the company that has the peripherals and the vision. Tecmar.

In all, Tecmar has more than 150 peripherals and add-ons for your computer. So, when you're ready to expand, ask for Tecmar. Or write for our brochure.

Tecmar, Inc., 6225 Cochran Road, Solon, OH 44139 USA, Tel. (216) 349-0600, Telex 466692.

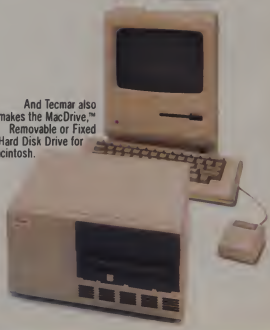
Tecmar International, Inc., Avenue de la Tanche, 2, B1160 Brussels, Belgium, Tel. (02) 660-44-51, Telex 25387.

Tecmar

THE POWER BEHIND THE PC

For large memory storage, Tecmar offers your PC a variety of Hard Disk Drives with capacities up to 74 megabytes. These include Removable Disk Drives for unlimited hard disk storage.

And Tecmar also makes the MacDrive,™ Removable or Fixed Hard Disk Drive for the Macintosh.



Something Totally New in Applications Software From Borland, The Folks Who Make Turbo Pascal.©

SIDEKICK

ALWAYS JUST A KEYSTROKE AWAY . . .

"SOMETHING TO RELIEVE THIS MESS!"

If you've ever found yourself searching for a calculator or a notepad when you've got a computer right in front of you, then you know why we came up with Sidekick®.

WHETHER YOU'RE RUNNING 1-2-3, WORDSTAR, dBASE II OR WHATEVER . . .

JUST A KEYSTROKE AND A SIDEKICK WINDOW OPENS . . .

- **A CALCULATOR**
- **A NOTEPAD**
- **AN APPOINTMENT CALENDAR**
- **AN AUTO DIALER**
- **AN ASCII TABLE**
- **AND MUCH MORE**

ALL AT ONCE . . . OR ONE AT A TIME, ANYWHERE ON THE SCREEN YOU LIKE.

ANOTHER KEYSTROKE, AND YOU'RE RIGHT WHERE YOU LEFT OFF IN YOUR ORIGINAL PROGRAM!
(you never really left!)

SIDEKICK
INTRODUCTORY OFFER
$49.95
Requires 128K for the IBM PC, XT or jr and compatibles

Something brand new. Crafted in Assembly language as carefully as Borland's famous Turbo Pascal®, so that it's lightning-fast and as compact as only Borland knows how to make it! With a notepad that has a full-screen editor that saves your notes to disk. You can even swap information back and forth between your applications software and your Sidekick®.

Suppose you're working with a spreadsheet, and you suddenly have an important idea. Just hit the button, a window opens, you write the note and hit the button again. You're right back where you left off in the spreadsheet.

Need to make a phone call? Whether the number is in an existing database, your own Sidekick phone directory, or you've just typed it on the screen — put the cursor next to the number, hit the keystroke, and Sidekick dials for you!*

There's lots more, too. You can move the Sidekick windows anywhere on the screen you like. And you can have as many on screen at a time as you need.

We designed it because we needed it. If you've ever been writing a report and needed to do a quick calculation, or jot down a note, then you understand why. *Only with Hayes Smartmodem and compatibles.

YOU CAN ORDER YOUR COPY OF SIDEKICK® TODAY!

For Visa and MasterCard orders call Toll Free 1-800-255-8008 in California 1-800-742-1133
(lines open 24 hours, 7 days a week) Dealer and Distributor Inquiries Welcome 408-438-8400

SIDEKICK® $49.95
(plus $5.00 shipping and handling - Shipped UPS)

Check ☐ Money Order ☐
VISA ☐ MasterCard ☐
Card #
Expiration Date

Please be sure your computer is an IBM PC, XT, jr or *true* compatible!

NAME
ADDRESS
CITY STATE ZIP
TELEPHONE

California residents add 6% sales tax. Outside U.S.A. add $15.00. (If outside of U.S.A. payment must be by bank draft payable in the U.S. and in U.S. dollars.) Sorry, no C.O.D. or Purchase orders.

F24

BORLAND INTERNATIONAL
Borland International
4113 Scotts Valley Drive
Scotts Valley, California 95066
TELEX 172373

CIRCLE 105 ON READER SERVICE CARD

REACH FOR A TEACHER

TEACH YOURSELF. TRAIN OTHERS. BY LISTENING TO FLIPTRACK COURSES ON CASSETTE. No more digging through manuals. Or fighting class schedules. Just pop a FlipTrack teacher into any standard cassette player. Sit down at your computer. And start learning. At your pace. At your convenience. There's no clearer, quicker or easier way to master your computer and its software. In hours, not weeks.

THE FLIPTRACK ADVANTAGE. A FlipTrack teacher lets you learn hands-on. Nothing is simulated. The patented FlipTrack format lets you choose just the topics that interest you. At a flip of the tape. And a fully indexed Guide puts it all down in black and white. For instant recall. Anytime.

Select from these tested "how to" courses for . . .

PROFESSIONAL COMPUTERS

APPLE IIe (PRO DOS VERSION) 2 Cassettes & Guide, #FHA064	$39.95
APPLE IIe (DOS 3.3 VERSION) 2 Cassettes & Guide, #HH018	$57.00
APPLE II PLUS 2 Cassettes & Guide, #HA011	$57.00
APPLE III (& III PLUS) 2 Cassettes & Data Tape & Guide, #HD015	$110.00
IBM PERSONAL COMPUTER 2 Cassettes & Guide, #HF017	$57.00
IBM PC JR. 2 Cassettes & Guide, #HFAP040	$39.95
IBM XT 2 Cassettes & Guide, #HH027	$75.00
FRANKLIN ACE 1000 2 Cassettes & Guide, #HS026	$57.00
CP/M (FOR ANY COMPUTER) 2 Cassettes & Guide, #SB013	$60.00
CP/M-86 (FOR ANY COMPUTER) 3 Cassettes & Guide, #SM024	$75.00

WORD PROCESSING

APPLE WRITER 3 Cassettes & Guide, #SW026	$57.00
EASYWRITER II 3 Cassettes & Guide, #SP025	$57.00
MULTIMATE 3 Cassettes & Guide, #SFAM046	$57.00
WORDSTAR 3 Cassettes & Guide, #SC014	$57.00
WORDSTAR & MAILMERGE 4 Cassettes & Guide, #SB018	$75.00

SPREADSHEETS

MULTIPLAN 4 Cassettes & Guide, #SM023	$75.00
SUPERCALC 4 Cassettes & Guide, #SL022	$75.00
VISICALC 4 Cassettes & Guide, #SE016	$75.00

INTEGRATED SOFTWARE

FRAMEWORK 4 Cassettes & Guide, #SFAT047	$75.00
LOTUS 1-2-3 4 Cassettes & Guide, #ST029	$75.00

HOME COMPUTERS

COLECO ADAM 2 Cassettes & Guide, #37131-18	$29.95
ATARI 600XL,800XL 1 Voice-Data Tape & Guide, #37131-13	$19.95
COMMODORE 64 1 Voice-Data Tape & Guide, #37131-10	$29.95
COMMODORE VIC-20 1 Cassette & Data Tape & Guide, #37131-11	$19.95
TEXAS INSTRUMENTS 99-4A 1 Voice-Data Tape & Guide, #37131-12	$16.95

HOW TO USE WORDSTAR & MAILMERGE
HOW TO OPERATE YOUR COMPUTER UNDER CP/M
HOW TO USE LOTUS 1-2-3
HOW TO OPERATE THE APPLE IIe
HOW TO OPERATE THE IBM PERSONAL COMPUTER
Operator's Guide

MONEYBACK GUARANTEE. Order with confidence on a 15-day right of return basis. Prompt refund if not delighted. To order, send check that includes $2.50 per course for shipping and handling. Or Visa and MasterCard holders may order TOLL FREE:

800-222-FLIP (In Illinois, call 312-790-1117.)

CIRCLE 142 ON READER SERVICE CARD

FlipTrack® Learning Systems

999 Main, Glen Ellyn, IL 60137

In This Issue

Evaluations & Profiles

10 **Epson PX-8** ..... *Ahl*
A notebook computer with many novel features

20 **A New Keyboard For The IBM PC** ..... *Lockwood*
Which one is right for you?

30 **Apple IIc Revealed** ..... *Linzmayer*
Apple flexibility in a portable package

40 **Acorn** ..... *Anderson*
A tall oak in education

46 **Havac Computer** ..... *Linzmayer*
An Apple work alike at a modest price

52 **Preschoolers Learn At Home** ..... *Smith*
Five packages for younger family members

62 **Sesame Street Meets Silicon Alley** ..... *Linzmayer*
CCW educational games for the Color Computer

66 **Growing Up Literate** ..... *Staples*
Learn to read and write by computer

76 **Software For Learning Mathematics** ..... *Ahl*
We look at 25 programs

92 **Expert Systems** ..... *Ahl*
Innovative products from Human Edge Software

Articles

96 **Computers in Special Education** ..... *Kleiman & Humphrey*
Can kids with learning problems benefit from computers?

102 **Is There A Wufflegump in Your House?** ..... *Van Tyle*
Creative talks to top educational software designers

106 **What's New In Hardware** ..... *Lockwood*
A computer from ITT; an upgrade from IBM

110 **What's New in Software** ..... *Lockwood*

Choosing and Using an Integrated Software Package

This month's special section by George Blank

S2 How to Buy an Integrated Software Package

S4 Integrated Packages: A Closer Look

S9 Previews of Coming Attractions

S10 Directory of Integrated Software Packages

S15 Manufacturer Listing

Applications & Software

131 **Structured Programming in Basic** ..... *Luehrmann*
Control Structures in ANSI Basic

141 **A Calculus Game** ..... *Wigley*
Even this nemesis can be fun

Departments

6 **Input/Output** ..... *Readers*

8 **Notices** ..... *Fee*

147 **LogoType** ..... *Muller*
Turtle Target Practice

150 **Telecommunications Talk** ..... *Murphy*
A new face for Western Union

158 **Print About Printers** ..... *Anderson*
DataSouth 220, TTXpress, and ESI smart spooler

165 **TRS-80 Strings** ..... *Gray*
Tired switches, biofeedback, and color photos

176 **Notebook Computing** ..... *Ahl*
News from Teleram, Sharp, Gavilan, and PCSG

178 **Apple Cert** ..... *Anderson & Linzmayer*
The IIc sees and speaks

182 **Commodore's Port** ..... *Anderson*
Sight and sound from Simon's Basic

187 **Outpost: Atari** ..... *Anderson*
Can Tramiel save Atari?

191 **IBM Images** ..... *Glinert-Cole*
MegaBasic: Rolls Royce or Subaru?

Cover: Photograph by Dennis Bettencourt.

October, 1984
Volume 10, Number 10

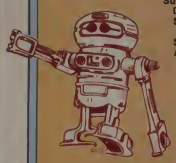
Creative Computing (ISSN 0 097-8140) is published monthly at 3460 Wilshire Blvd., Los Angeles, CA 90010 by Ahl Computing, Inc., a subsidiary of Ziff-Davis Publishing Company. David Ahl, President; Elizabeth B. Staples, Vice President; Selwyn Taubman, Treasurer; Bertram A. Abrams, Secretary. P.O. Box 789-M Morristown, N.J. 07960. Second Class Postage paid at Los Angeles, CA 90052 and additional mailing offices.

Copyright©1984 by Ahl Computing, Inc. All rights reserved.

Editorial offices located at 39 East Hanover Ave., Morris Plains, NJ 07950. Phone (201) 540-0445.
Domestic Subscriptions: 12 issues $24.97; 24 issues $43.97; 36 issues $57.97.
POSTMASTER: send address changes to Creative Computing, P.O. Box 5214, Boulder, CO 80321. Call 800-631-8112 toll-free (in New Jersey call 201-540-0445) to order a subscription.

Staff

Founder/Editor-in-Chief	David H. Ahl
Editor	Elizabeth B. Staples
Managing Editor	Peter Fee
Associate Editor	John Anderson
Assistant Editors	Owen Linzmayer Russ Lockwood
Reviews Editor	Paul Grosjean
Editor-at-Large	Ken Uston
Contributing Editors	Will Fastie Susan Glinert-Cole Danny Goodman Stephen B. Gray Glen Hart Stephen Kimmel Art Leyenberger Brian Murphy Ted Nelson Peter Payack Alvin Toffler



Copy Editor	Sherrie Van Tyle
Editorial Assistant	Laura Gibbons
Secretary	Diane Koncur
Auditor	Jennifer Shaler
Design Director	Brian Dessin Day
Art Director	Patrick Calkins
Assistant Art Director	Chris DeMille
Artists	Eugene Bicknell Peter Kelley
Typesetting	Karen K. Brown
Creative Computing Press	Laura Conboy
Administrative Assistant	Joanne Sapio
Retail Marketing	Susan DeMark
Operations Manager	Dan Nunziato
Fulfillment	Francis Miskovich Rosemary Bender Linda Blank Pat Champion Elsie Graff Carol Vita Jim Zecchin Barbara Carnegie Lisa Dickisson Donna Stetel Cheryl Schauble Valerie Gaddis Mauricio Algarra John Ziegentuss
Shipping & Receiving	Ronald Antonaccio Richard Crawford Andy Dayan David Lewis William Sprouls

Advertising Sales

Publisher
Claude P. Sheer
Creative Computing
Ziff-Davis Publishing Company
One Park Ave.
New York, NY 10016
(212) 503-5011

Advertising Coordinator
Chris Tice
Creative Computing
Ziff-Davis Publishing Company
One Park Ave.
New York, NY 10016
(212) 503-5012

Northern California, Northwest
Jeff Miller
Ziff-Davis Publishing Company
11 Davis Drive
Belmont, CA 94002
(415) 594-2290

Southern California, Southwest
Tom Martin
Susan Curtis Scott
Ziff-Davis Publishing Company
3460 Wilshire Blvd.
Los Angeles, CA 90010
(213) 387-2100

New England
Merrie Lynch
Nancy Wood
CEL Associates, Inc.
61 Adams Street
Braintree, MA 02184
(617) 848-9306

Midwest
Jeff Edman
William Biff Fairclough
The Pattis Group
4761 W. Touhy Ave.
Lincolnwood, IL 60646
(312) 679-1100

Mid-Atlantic, Southeast
Larry Levine
Ziff-Davis Publishing Company
One Park Ave.
New York, NY 10016
(212) 503-5013
(201) 972-9466

Canada
The Pattis Group
501 Eglinton Ave. E.
Suite 202
Toronto, Ontario M4P 1N4
(416) 462-6288

Ziff-Davis
Consumer Computers & Electronics Magazine Division

Vice President/General Manager	Eileen G. Markowitz
Vice President Licensing and Special Projects:	Jerry Schneider
Vice President Creative Services:	Herbert Stern
Vice President Circulation:	Carole Mandel
Creative Director:	Peter J. Blank
Marketing Manager:	Ronni Sonnenberg

Permissions

Material in this publication may not be reproduced in any form without permission. Requests for permission should be directed to Jean Lamensdorf, Ziff-Davis Publishing Company, One Park Avenue, New York, New York 10016.

Where To Send It

All editorial material, including article submissions, press releases, and products for evaluation should be sent to:
Creative Computing
39 E. Hanover Ave.
Morris Plains, NJ 07950

Correspondence regarding other Creative Computing products and publications should also be sent to the Morris Plains address.

Correspondence related to **advertising**, including ad copy, questions on billing, and requests for rates, should be sent to:
Advertising Department
Creative Computing
Ziff-Davis Publishing Co.
One Park Ave.
New York, NY 10016

Correspondence regarding **subscriptions**, including orders, changes of address, and problems should be sent to:
Creative Computing
P.O. Box 5214
Boulder, CO 80321

Your help in choosing the correct address for your correspondence is appreciated. An incorrectly addressed letter or package can take as long as several weeks to reach its proper destination.

Subscriptions

All subscriptions orders and other correspondence related to subscriptions should be addressed to:
Creative Computing
P.O. Box 5214
Boulder, Colorado 80321.
Foreign subscriptions must be accompanied by payment in U.S. currency.

Subscription prices:

U.S.	Canada	Foreign
1 year $24.97	1 year 29.97	1 year 34.97
2 years 43.97	2 years 53.97	2 years 63.97
3 years 57.97	3 years 72.97	3 years 67.97

Airmail delivery on foreign subscriptions is available for a one-year period only at $75.00 additional for mail to Asia and Australia, and $50.00 additional for all other foreign.

Subscribers in the United Kingdom may send payment in sterling to:
Hazel Gordon
10 Bishops Way
Sutton Coldfield
West Midlands B74 4XU

Please allow at least eight weeks for change of address. Include old address as well as new—enclosing if possible an address label from a recent issue.

Attention Authors

Creative Computing will not be responsible for the return of unsolicited manuscripts, cassettes, floppy disks, program listings, etc. not submitted with a self-addressed, stamped envelope

New Qantex 7065. A fast printer at a slow price.

No matter how heavy the traffic, our new Qantex 7065 multimode printer will keep your documents flowing smoothly. At a very affordable price.

Use it for data processing, and the 7065 zips along at 300 cps bidirectionally. Both user-defined formats and six-part forms capability are standard.

Switch to word processing and the 7065 delivers near letter quality at 125 cps. Plus features such as proportional spacing, justification, auto-underline and bold.

And as a 65 cps letter quality printer, it's fast enough and quiet enough to leave the competition in the dust. You get high density, double pass printing in your choice of some 20 fonts.

The 7065 is also a dot addressable graphics printer with resolution to 144 x 144 dots per inch and a full complement of line drawing graphics.

Besides being very fast, the 7065 is very compatible — with IBM, Apple, Lotus 1-2-3 and just about any other personal computer or software on the market. It offers built-in bar code capability. And its 500-million-plus character print head and industrial quality construction are designed for long, hard use.

To find out how quickly the Qantex 7065 could bring your information processing up to speed, contact Qantex for details or a demo. Qantex, 60 Plant Avenue, Hauppauge, NY 11788. Call toll-free 800-645-5292; in New York State 516-582-6060.

north atlantic
Qantex

CIRCLE 178 ON READER SERVICE CARD

Input/ Output

Sell Shocked

Dear Editor:

I have a few things to point out in reference to your "Undercover Consumer" article (June 1984).

I am a systems consultant for the largest computer store chain in the St. Louis metropolitan area. We know the machines we sell inside and out. But we are *not* required to learn what any machine can or cannot do if we don't carry it. In fact, we are discouraged from discussing what other machines can do. We naturally might be a little biased, and it would not be fair to let that bias enter into the customer's final decision.

Also, I would like to point out that we are not commissioned employees. We are salaried. That means that if I don't sell a computer to you, or if I don't sell our most expensive system, I will still have dinner on my table. What I am saying is that we are not all "sharks."

Your story makes it sound as though all computer salespeople are sly and underhanded. You are scaring those people who are new to computers and who are considering purchasing one.

Kevin Oesterle
3 Shawn Dr.
Belleville, IL 62221

Why so defensive, Kevin? Did we say anything about commissions? Did we ever mention sharks or other predators? Did we imply that anyone was sly or underhanded? Did you read the entire article?

True, we did say that salespeople should have some knowledge of the competition, and we stand by that assertion. We don't expect you to give a sales pitch for your competitors, but we do think a customer is entitled to an answer to the question "Why is this computer better suited to my needs than the one I can buy across the street for $500 less?" Your policy suggests that the salesperson needs to know less than his customer, and if that is the case, the customer might as well buy mail order and save some money.

We thought that our conclusions were, on the whole, positive. After all, we did end by advising buyers to "head for the nearest reputable computer store." And we haven't heard from a single terrified customer yet. —*EBS*

Japan Revisited

We received a tremendous outpouring of letters about the August (all Japan) issue. Most writers were quite favorable, although there were two who said they missed the regular reviews and columns; only one said he "found the issue to be a waste." Several writers favorably compared our comprehensive coverage to the spotty coverage in some of our competitors; for that we are pleased. Another reader wrote to say that she is using parts of the issue in an English class for Japanese businessmen and scientists.

However, we received letters from two Japanese people about an issue that ought to be clarified, in particular my statement that there are no minorities in Japan. In fact, there are, and the three or four percent who are in these minorities are subject to persistent discrimination in residence, education, and occupation. The letter below from Chang Kuk Cho sets the matter straight. —*DHA*

Dear Editor:

You wrote that there are no minorities in Japan and that no foreigner is welcomed in Japan except on a temporary basis. The second part of your statement is true. However, despite Japan's dislike of other racial and ethnic peoples, Japan does have her share of minorities. To begin with, there are the Ainu, the aborigines of the Japanese archipelago. Many Ainu still live in the island of Hokkaido, keeping their distinct culture.

The Okinawans constitute another minority, with a distinct set of languages and culture, occupying a whole prefecture in the southern sea. Then there are the Koreans, many of whose parents were forcibly brought to Japan to become cheap laborers during Japan's colonial control of Korea. They now comprise the largest ethnic minority in Japan, numbering over 1 million. In addition, there are the burakumin, the untouchables of Japanese society. Although they are Japanese in ethnicity, the burakumin, now about 2 million, are treated as a social caste, allowed to have only the most menial kinds of jobs.

The Japanese like to think of Japan as a mono-ethnic nation and consciously or unconsciously avoid talking about the minorities in Japan. If none of the Japanese you met mentioned the existence of over 4 million minority members, I am not surprised. But I am saddened that through your editorial you unintentionally helped to preserve and further spread among the American public the myth of Japanese monoethnicity.

Chang Kuk Cho
Berkeley, CA

True Grid

Dear Editor:

Your HP110 article appearing in the July issue was informative and enjoyable but you say the following things about the HP110 that range from incorrect to misleading to personal opinion:

- Your "thoughts ran again and again to the 'ultimate portable.' "
- That "the HP110 is quite simply the finest notebook computer available on the market today."
- That the HP110 is "The most powerful self-contained portable computer system ever offered."
- It has "the sexiest ROM software you have ever imagined."
- It "is absolutely the sturdiest portable we have seen to date."
- It "is probably the first practical means of bringing a serious and powerful computer to the problem...it is built to withstand tough field conditions that no other portable would withstand over term."
- "I have never seen a portable computer with anything remotely approaching the level of help that the 110 offers."
- 384K is "more ROM than any microcomputer has used before."
- "If you have $2995 to spend on a portable, there is no other machine to consider."

Evidently you have never used, seen, or even read about the Grid Compass, particularly the 1129. Granted, the Compasses are primarily AC line powered (one runs only an hour on the

LEARNING & FUN GO HAND 'N' HAND

LOGIC
Robot Odyssey I
A revolutionary robot construction set and adventure game. A must for teenagers and grown-up teenagers. Another breakthrough program from the

From the Producers of Rocky's Boots™

Robot Odyssey I™

A Revolutionary New Educational Software Program for Teenagers and Young Adults.

Fall into the underground world of Robotropolis and see if *you* can find the way back to civilization. Build maze-blazing robots! Trek through five mini-games! And become an original game designer!

Finally, an educational software program that's both an adventure game and robot construction set. Learn how to design integrated circuits, burn chips and program robots.

And "they" said it couldn't be done.

So take on the challenge. Stop by your local dealer and see Robot Odyssey I for yourself. It's the game of the decade.

Enter the Robot Odyssey I Sweepstakes!

2 Grand Prizes: Androbot® Topo™ Robots.

10 Runner-Up Prizes: Androbot's *New* F.R.E.D. Robot.

To enter, send your name and address along with the phrase "Robot Odyssey I Sweepstakes," to The Learning Company (address below). All entrants receive a free color poster.

The Learning Company

545 Middlefield Road, Suite 170 • Menlo Park, CA 94025 • 415-328-5410

CIRCLE 155 ON READER SERVICE CARD

battery pack, which while small is also external to the computer), and "truly" transportable computers would be internally battery powered. It has to be on that one criterion alone that you evaluated the HP110 against the Compass 1129, because every one of your statements above is either false or misleading when the 1129 is considered.

Aside from the one-hour external battery pack, the following comparison of the 1129 and the 110 is much more accurate than yours:

- The 1129 is much closer to the "ultimate computer."
- The 1129 is easily the finest notebook computer on the market today.
- The 1129 is the most powerful self contained portable computer system ever offered; some more tradeoffs come into play here—the 384K bubble in the 1129 (where code can be executed from directly without transferring it into RAM); the Grid portable floppy drive (also capable of being powered by the external battery pack).
- The 1129 has the sexiest ROM software you ever imagined.
- The 1129 is nearly mil spec, is taken on every space shuttle flight, was parachuted into Grenada with the U.S. troops, and is a very popular product within the tactical military to whom ruggedness is essential.
- The help facilities of the 1129 are better than those of the 110.
- The 1129 has 512K of *plugable* ROM storage unlike the 384K *fixed* in the 110.
- If you have *only* $2995 to spend on a portable computer, the 110 is certainly currently the best choice (the 1129 costs several times more).

I suggest that you read the 1129 brochures and have your local rep come over and demonstrate it to you. I guarantee that you will feel more disappointed when he leaves with the 1129 than you were to send back your 110.

Prof. E. Douglas Johnson
Carnegie-Mellon Univ.
Pittsburgh, PA 15213

The Grid is undeniably a fine machine—but its power-hungry display makes access to an AC line all-important, a fact that makes it less than perfect in our admittedly personal opinion. For the price of the Compass, I'd much rather buy an HP110 and a Toyota Tercel to carry it in. —JJA

Furthermore, we have asked Grid for an evaluation unit several times and have never received so much as a reply. Since our reviews are never based on brochures or demonstrations, we have been forced to conclude that Grid has decided that our readers are not interested in their product. —EBS

Notices

$4 Million Giveaway

Scarborough Systems has announced it will sponsor a program designed to provide donated software valued at up to $4 million to public and private schools this fall.

Consumers who purchase one of Scarborough's seven educational software programs between September 15 and December 15 will become donors of another Scarborough program of their choice to any teacher and school they select.

Purchasers of any Scarborough educational product will receive a "donation certificate" entitling them to give a Scarborough product of their choice to a teacher and school of their choosing. To make the donation, consumers will return the certificate with a product warranty card and a handling and mailing fee of $3.50 to Scarborough. The publisher, in turn, will send the designated software program to the school with a gift card indicating the donor's name.

Scarborough programs include *MasterType*, *Phi Beta Filer*, a list management program for children; *Run for the Money*, a business game with a space-age theme; *Songwriter*, *Picturewriter*, *Patternmaker*, and *Laser Shapes*. Retailing for $39.95 to $49.95, all are or soon will be available for the Apple II family of computers, Commodore 64, IBM PC and PCjr, and Atari.

Announcing... The Transatlantic Computer Puzzle Challenge

In July 1984, an envelope was placed in a room pictured on the cover of the book, *Microcosm*. The winner of the challenge will be the first person to phone this room

and state the name which is written on a slip of paper in the envelope.

The winner will receive £1000 (approx. $1400) and a trip across the Atlantic by Concorde.

The puzzle is found in the book and can be solved with the aid of a personal computer. Look for the book in your local bookstore. If you can't find it, watch for an ad in next month's *Creative Computing* that will give an address from which it can be ordered.

Free Magazines for Schools

From time to time, we have extra unsalable copies of *Creative Computing* which we will furnish free to schools on an "as available" basis. These copies are generally newsstand returns, damaged, or withdrawn from sale (more than one year old).

If you would like to be placed on a list to get such copies, please drop us a postcard with the quantity you would like (multiples of 20 please), the intended use (classroom, computer fair handouts, teacher handouts, etc.), the approximate date you would like them, and the shipping address. Only one shipment per school per semester.

We make absolutely no guarantees whether we will have any extras at all, but any we have will be sent out. Send your request to Diane Koncur, Creative Computing, 39 E. Hanover Ave., Morris Plains, NJ 07950.

INTRODUCING A NEW BREED OF ELEPHANT.™

The Elephant Memory System

Introducing Elephant Premium Floppy Disks. Specially designed for your most demanding business needs, they'll protect your data when other disks won't. In fact, they exceed industry certification standards by more than 50%. Which is why we say Elephant Never Forgets.®

Plus, Elephant Premium is the only floppy disk that features The Elephant Memory System™—a labeling and filing system that makes it easy to store, reference and protect your disks.

And since they're compatible with the IBM PC® and other popular business computers, our Elephants will be right at home in your office.

For the Elephant dealer nearest you, call 1-800-343-8413. In Massachusetts, call collect 617-769-8150.

Dennison

ELEPHANT NEVER FORGETS.

Serving business for over 140 years.

CIRCLE 127 ON READER SERVICE CARD

Epson PX-8 "Geneva"

HARDWARE EVALUATION

David H. Ahl

Epson, you will remember, introduced the very first notebook computer, the HX-20, in 1982. We were very enthusiastic about the machine despite its diminutive 4-line by 20-character display size. Unfortunately, it got off to a slow start and was soon eclipsed by the Tandy Model 100 with its larger screen and—although some will argue with me—more user-friendly design.

Now, two years later, we have put the second-generation Epson portable, the PX-8 "Geneva," through its paces. Epson has done just about everything right the second time around. Nevertheless, we have mixed feelings about the machine, partially as a result of the competition and partially as a result of, well, overdoing some of the features. "Sounds strange," you say. Read on.

Nifty Hardware

The PX-8 is a compact machine (8.5" x 11.5" x 1.8") and weighs just over four pounds. In this neat package is a tilt-up 8-line by 80-character LCD screen, micro-cassette recorder, full-size keyboard (with some extras), and, of course, the guts of the computer.

The main mpu is a CMOS version of the 8-bit Z80A, the same chip found in the HX-20 as well as the Tandy 100. A 6301 slave mpu is used as a device controller for the serial interface, LCD display, microcassette drive, and ROM capsules. A second slave mpu (7508) controls the keyboard, clock, and power supply. This should give the computer improved throughput on most tasks although, of course, on our computation-bound benchmark it was no great ball of fire.

Computer	Time	Accuracy *
NEC 8201	1:44	.187805
Epson PX-8	1:44	.187805
Epson HX-20	2:36	.0338745
Tandy 100	4:54	.0000002058

(* Lower is better)

Speed and accuracy of the PX-8 and other selected computers.

The system has 64K of RAM, 32K of ROM, four interfaces (RS-232, serial for disk drive or printer, analog, and bar code reader), built-in speaker, real-time clock, microcassette recorder, and provision to add an external clamp-on "RAM disk" with either 64K or 128K. You might expect the RAM disk to be a couple of plug-in chips in carriers. Not so; it is a unit the full width of the computer that fits under the rear of the PX-8 and elevates it about one inch. Without the RAM disk, two folding legs on the rear of the PX-8 raise it a similar amount to provide a comfortable typing angle.

The packaging bespeaks solid quality. All switches are recessed slightly so nothing

HARDWARE PROFILE

Name: Epson PX-8 "Geneva"
Type: Notebook portable
CPU: 8-bit Z80A
RAM: 64K
ROM: 32K
Keyboard: 63 key, full stroke
Display: LCD, 8 lines x 80 characters
64 x 480 pixels
Mass Storage: Built-in microcassette drive
Ports: RS-232, serial, bar code, analog
Operating System: CP/M 2.2
Software: (on ROM pack)
Microsoft Basic
CP/M Utilities
MicroPro WordStar
Portable Calc/Scheduler
Documentation: Four manuals
Dimensions: 8.5" x 11.5" x 1.8"
Summary: Solidly-built notebook portable computer with excellent applications software and many novel features.
Price: $995
Manufacturer:
Epson America, Inc.
3415 Kashiwa St.
Torrance, CA 90505
(213) 539-9140

QUARK ANNOUNCES

a clever way to store more than sixty-five floppies.

QC10™

A 10MB hard disk for your Apple IIc, Apple IIe, Apple III or Macintosh.

Quark's new QC10 hard disk lets you store the contents of more than sixty-five floppies. Even if you're using an Apple IIc. Which means you can have the equivalent of nearly five thousand pages of information ready for instant retrieval.

You'll have room for dozens of programs. From complex accounting software to sales analysis tools. With space left over for your answer to "War and Peace"

And because there's a distinction between those who need to know and those who want to know, QC10 lets you create password-protected "volumes" of any size you choose. So you can segment your data to suit your particular needs, and protect sensitive information.

Plus, if you have an Apple IIc or Macintosh—or a 128K Apple IIe with Apple's Duodisk dual disk drive—QC10 *requires no accessories.** The drive simply plugs into the disk drive port. Two special switches let you set your QC10 for whatever computer you use.

And when you add Quark's Catalyst™ program selector, you can automatically load even copy-protected ProDOS programs on QC10.** And switch between applications with a simple keystroke sequence. So you won't have to change floppies when you need to change programs.

Best of all, QC10 has a suggested retail price of only $1,995. So ask for a demonstration today. Just call toll-free, 1 (800) 543-7711, for the name of the Quark dealer nearest you.

Quark PERIPHERALS

A Subsidiary of Quark Incorporated

Quark, QC10 and Catalyst are trademarks of Quark Incorporated. Apple ProDOS and Duodisk are registered trademarks of Apple Computer, Inc. Macintosh is a trademark licensed to Apple Computer by McIntosh Laboratories, Inc.

*If you do not have a Duodisk, or use an Apple III, a special cable is available. See your dealer for details.

**Catalyst works on the Apple IIc, IIe and Apple III. It is not compatible with Macintosh.

Photography by Barbara Kasten

CIRCLE 179 ON READER SERVICE CARD

protrudes beyond the edge of the case. Indeed, the reset switch can be pushed only with the tip of a ballpoint pen. Connectors are provided on the back for the RS-232 and serial ports, battery recharger, and other external devices. A slide control beneath the tilt-up LCD screen controls the view angle of the liquid crystal elements, and a similar control on the side controls the speaker volume.

The display measures 1.3" x 8.7" and, depending upon the software being used, can operate in up to four modes. (Characters, incidentally, are formed in a 5 x 7 dot matrix and do not have descenders.) Mode 0 is the standard 80-column character mode. Mode 1 splits the screen into two halves, each 39 characters wide. Mode 2 is also a split screen mode but the widths of the two windows can be set by the user in the range of 8 to 48 characters. Mode 3 is a graphics mode, although text may be displayed in this mode also.

Complicating matters somewhat is the fact that the real screen is actually a window on a virtual screen which may be much larger than the real screen (up to 40 lines and 80 columns). Moreover, in Modes 1 and 2, there are two virtual screens which, in Mode 2, may be viewed independently of one another. In general, unless you are writing applications programs, you will not have to worry about these screen modes. However, a rudimentary understanding of them will give you an insight as to how Portable WordStar, Calc, and Scheduler achieve some remarkable effects. Of course, for the adventuresome, all these screen modes are available from Basic, and to a limited extent, from the CP/M operating system (using CONFIG).

The keyboard has 63 full-stroke keys which have the excellent feel that we have come to expect from Epson. The keyboard uses a hard stroke design and aural feedback is provided by the noise of the key hitting the bottom of its travel. Indeed, the keyboard is rather noisy (like the Model 100) and we felt it would have benefitted from some acoustic damping.

Layout of the keys is perfectly standard with no keys in unexpected places. The orange cursor control keys at the right are arranged in a reasonably logical pattern; in the same area, we find the CLR/DEL, SCRN/INS, and HOME/BS keys. We won't explain the function of each of these special keys, but we were disconcerted to note that they functioned differently in the applications software packages than they did in CP/M and Basic.

A very thoughtful touch is the series of three LEDs above the center of the keyboard which indicate caps lock, numeric keypad on, and insert on. The keyboard provides access to every printing character including 32 graphics characters (lines, circles, card suits, car, plane, man, telephone, etc.). For the most part, these

Top: LCD screen displays 8 lines of 80 characters.
Bottom: Standard layout keyboard has excellent feel.

characters will not print out unless your printer is equipped with a special ROM. All keys repeat when held down for about one-half second.

Above the standard keyboard is a line of nine rectangular function keys. Leftmost is a red STOP key, which functions in Basic and CP/M but generally not in applications software packages. Three of the function keys have permanent labels: ESC, PAUSE, and HELP. As with STOP, they may or may not be implemented in applications software packages. The other five light gray function keys are programmable and, in conjunction with SHIFT, provide ten functions which may be set in software or from the CONFIG program in CP/M.

The microcassette recorder uses standard tapes and usually is completely under software control, although it is possible to use the function keys for manual operation. We found the recorder useful for saving Basic programs but extremely cumbersome to use with *WordStar*. In fact, in the *WordStar* manual on page 9.17 it says, "The microcassette tape can be used to store files" and five paragraphs later on page 9.18 it says, "You cannot save files onto the microcassette tape." Not very helpful!

A clock module manages the software clock and controls alarm and wake functions which allow the PX-8 to switch on and present a message or start a program running. If the computer is in use, and alarm or wake time is reached, the program being run will be interrupted. A wide range of time options are available for these functions, including a specific date and time, every hour, every 24 hours, once a month, every day for a month, every minute for ten minutes every hour, or practically any combination you can dream up.

The PX-8 uses two sets of batteries. The main NiCad battery pack provides power for running the PX-8, while the back-up batteries hold programs in memory when the main battery voltage falls below a useable level. According to the manual, "The maximum length of use on battery power is 15 hours without input/output operations" (does that mean the keyboard?). The AC charger/adapter will restore a full charge to the batteries in eight hours.

CP/M Operating System

When the PX-8 is turned on, a number of routes can be taken by the built-in operating system. Most typically, a menu, which lists the command (COM) programs on devices B and C, will appear. These devices are ROM cartridges which plug in the bottom of the PX-8. We used four such cartridges: Basic, CP/M utilities, Portable WordStar and Portable Calc

It Speaks For Itself

now with audio learning cassette

...super database ...from Precision Software ...is one of the best of the lot." RUN magazine, May 1984

Superbase

The complete database

CIRCLE 175 ON READER SERVICE CARD

Precision Software

Precision Software, Inc.
Consumer Products Division
3003 Summer Street
Stamford, CT 06905
Telephone: 203-326-8649

Available for Apple® IIc, IIe, and Commodore 64™ and Plus 4™ from your local retailer.

Trademarks: Precision Software, Inc.

(which includes Portable Scheduler). Only two can be plugged in at one time. A program is selected from the menu by moving the cursor over the program name and pressing RETURN. If you prefer to work directly from CP/M, the built-in operating system, the ESC key will exit the menu and bring up the familiar C prompt. This is the approach necessary to load programs from any of the other devices: A is the RAM disk, D through G are floppy disk drives, and H is the microcassette. If you expect to use a program from any of these devices regularly, it is possible to rebuild the menu program to include it.

CP/M functions just as it would on a desktop computer and has the usual commands and utilities, cryptic error messages, and other idiosyncrasies. In addition, it has two programs unique to the PX-8. TERM is a program that allows the use of the PX-8 as a terminal to another computer, remote database, or on-line service bureau. The manual provides extensive instructions for using the PX-8 to communicate with an Epson QX-10 desktop computer although the directions are applicable for other CP/M systems as well.

FILINK is used to transfer files between the PX-8 and other computers. It is more specialized than TERM in that it supports specific protocols and is used solely for sending and receiving files. From the manual, it would appear that FILINK must be used with another computer also running FILINK, and the only other machine for which it is available at the moment is the QX-10.

CP/M was the first microcomputer operating system I ever used (on an Altair in 1976), and thinking about it conjures up all kinds of fond and not-so-fond memories. Some of the latter surfaced when, after using the PX-8 for just 15 minutes, I got the message BDOS ERROR ON D: BAD SECTOR. The manual said to press the RETURN key to ignore the error. Ha! Five presses of the RETURN key later, I had a screen full of the same error message. I tried STOP, ESC, HELP, everything...but there was no escape.

In desperation, I turned the computer off and back on. Ah; finally the menu reappeared, but the minute I tried to select something, the screen filled with the same BDOS ERROR message. Now, in real desperation, I pressed the recessed reset switch. But to no avail. The PX-8 has an excellent memory; it doesn't forget anything—not even error messages. Finally, for no explicable reason, a series of CTRL/ESC keypresses returned me to the operating system. To add insult to injury, the message was "incorrect"; what I had tried to do (by mistake) was write to a write protected disk.

Not being content to leave well enough alone, I experimented with some other commands that I felt an unwitting user might invoke. For example, the system uses double sided disks, so it might be logical to think of side 1 as drive 1 and side two as drive 2. So I tried to save a file to the second drive (E) and got the same BAD SECTOR message that just wouldn't go away. Not nice!

If you shut off the machine while you are in Basic and turn it on later, it will still be in Basic with the same program in memory, a nice feature. However, just try to get directly to CP/M when you power back up. It is not easy. I finally found that the combination of STOP/ESC would usually do it.

Perhaps warnings about all these naughty things are in the manuals—unlike some writers, I am not opposed to reading manuals—however, I do not feel that one should have to read two 300-page manuals before using the computer.

Basic

The Basic supplied with the PX-8 is "Epson-enhanced Microsoft Basic for the PX-8." Quite a mouthful. In general, it is quite similar to Microsoft GW Basic although, of course, it is oriented to the PX-8 LCD display and lacks certain graphics commands like CIRCLE (although LINE is included). Actually, a variety of graphics statements and functions are included specifically for the 480 by 64 pixel screen. Also, as mentioned earlier, Basic includes statements for using the four screen modes.

A screen editor allows changing program lines without entering a separate edit mode. Basic also has statements that support communication through the RS-232 serial interface and statements that make it possible to use the built-in microcassette recorder like a disk drive.

As in the HX-20, the Basic program area is divided into five parts so five programs can be stored simultaneously. As in a timesharing system (also the HX-20), these areas are accessed via a LOGIN command. One rather nasty problem I had was trying to save programs in these areas. (With the HX-20, the problem is deleting a program.) Actually, after poring over the manual and experimenting at great length, I determined that programs can be saved only to cassette, RAM disk, or floppy disk, and not in the five program areas.

Portable WordStar

As its name suggests, Portable WordStar is adapted from standard *WordStar* to run on the PX-8. The adaptation was done by MicroPro International, so the product is quite true to the original. It is our custom to write a computer review on the target machine whenever possible. This turned out to be remarkably easy and straightforward on the PX-8 as *WordStar* was familiar and behaved exactly as expected. Yes, some of the more esoteric features are stripped out—after all, the package has to fit in a 32K ROM cartridge—but it is remarkably complete.

Since we assume a basic familiarity with *WordStar*, it is probably easier to list the missing features rather than the included ones. Missing are: help menus, file directory, file renaming, paragraph tab, hyphen help, soft hyphens, column mode, decimal tab, and print control display toggle. Since I rarely use any of these, I did not find Portable WordStar at all limiting.

Clip-on thermal printer, RAM packs, the PX-8, and floppy drive.

PLUG IN THE BEST BUY IN SURGE PROTECTION: ELECTRA-GUARD.

FASTER THAN 5 NANO-SECONDS, STRONG AND SOLID STATE

Electra-Guard stops every spike, glitch and surge in less than 5 billionths of a second. All you do is plug it in. No more overvoltage.

We build it solid. Diodes, solder, wire and case —all are heavy duty. It far exceeds the surge voltage guides for AC power voltages.

Its simple style and neutral color suit your home or office.

$49.95 to $79.95

Electra-Guard System 2 (above left) keeps six devices safe from overvoltage. Cost: $49.95.

The System 4 (center) with EMI/RFI filter; protects 3 devices from overvoltage and electronic noise. Cost $79.95.

Electra-Guard System 12 (far right) has an on/off switch and 6 foot extension cord. It protects 6 devices for $59.95.

These Electra-Guards are the best buy in surge protection on the market. No others give as much protection for the money.

ELECTRA-GUARD PROTECTS UNCLE SAM, GTE AND BURGER KING

We sell Electra-Guards to the Air Force and Army; to Kentucky Fried Chicken; to the government's Geological Survey Department; to Honeywell, GTE, and hundreds more. We keep the circuits safe for business, government and industry all over America.

YOUR BEST BUY, WE GUARANTEE

Your Electra-Guard is unconditionally guaranteed for one year, and sure to be your best buy.

FREE BROCHURE!
PH 800-237-6010
(In Florida 813-544-8801)

Call. We'll send you a brochure that tells you all about power disturbances, surge protection and Electra-Guards.

We will also tell you the name of the dealer near you.

ELECTRA-GUARD ELECTRONIC SURGE SUPPRESSOR

If you depend on electronics, depend on Electra-Guard.

Computer Power Solutions, Inc.
8800 49th Street North, Suite 203
Pinellas Park, Florida 33565

CIRCLE 208 ON READER SERVICE CARD

"A MUST... A CLASSIC."
—InfoWorld

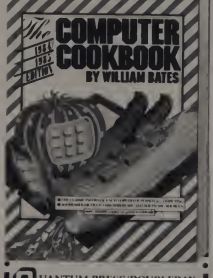
It's a classic that keeps getting better. The completely updated and redesigned 1984/85 edition of THE COMPUTER COOKBOOK features:

- Hundreds of illustrations, maps, charts, and product photographs.
- Two-color text, with important items highlighted in red.
- Marginal notes which amplify text entries.

THE COMPUTER COOKBOOK is actually a computer encyclopedia, one of the most comprehensive available, alphabetically arranged for easy use. Its entries range from nuts-and-bolts items like IBM's product line to such exotica as computer-generated astrological charts. New material includes:

- The latest in "low-end" home computers
- Complete coverage of new products—including the PC Jr, Adam, and Macintosh
- Biologics, optoelectronics, robots, supercomputers, new Japanese experimental computers
- Names and addresses of over 1,000 hardware and software sources

And much more. As much fun to read as it is an indispensable reference source, THE COMPUTER COOKBOOK belongs in every microcomputer library. $14.95 oversized paperback—wherever computer books are sold.



QUANTUM PRESS/DOUBLEDAY

CIRCLE 133 ON READER SERVICE CARD

One thing I found a bit annoying is that the top two lines on the screen are used for the status information (program name, page, line, column, and operating mode) and the ruler line (shows tab stops and margins). Furthermore, the package does not use the bottom line on the screen; hence, only five lines of text are displayed at a time. With a 65-character line length (printer width = screen width) this means that the PX-8 displays exactly the same amount of text as the Model 100 (which has a display half as large)!

As with many other portable computers, moving through a large text file is agony. To scroll through one double-spaced page takes 26 seconds. Hence, to insert a correction in the middle of a 16-page document like this review takes four or five minutes. A command to move the cursor to a particular page would be very welcome (MicroPro, are you listening?).

Portable WordStar comes with a 200-page manual, fold-out menu map, three-panel command reference card, and 26 sticky keytop labels with control key markings.

Other Applications

Portable Calc is an electronic spreadsheet program and includes the most used spreadsheet functions as found on desktop machines. The design approach was to economize on prompts and messages but try to retain the functions and calculating power of a larger program. We tried a few simple problems but did not put Portable Calc through an exhaustive evaluation. It has a complete array of arithmetic and logical functions, including MAX, MIN, LOOKUP, and AVG. It does not, however, have any statistical, trig, or financial functions. Replicating, inserting, deleting, saving, and printing are all handled quite adequately.

Portable Scheduler is a 25-day appointment scheduler that permits notations to be made in half-hour increments. In addition, alarms can be set at designated times and the next 24 days displayed in graphical form. I confess to being partial to a standard paper calendar and did not make use of this program (other than to make sure it loaded).

Peripherals

Unlike the situation with the HX-20 in which peripherals and software were not available until the computer had been out for more than a year, Epson is concurrently releasing a battery-operated 3½", double density, double sided, microfloppy disk drive. The drive measures 8.2" x 4.8" x 2" and has built-in NiCad batteries that provide up to 50 hours of service between charges. Formatted capacity is 320K per disk. The drive is connected to the computer through the serial port and tends to be somewhat slower than a standard desktop floppy disk; nevertheless, it is a substantial improvement over nothing at all, and considerably faster than the microcassette recorder.

RAM disk units in capacities of 64K and 128K (60K and 120K usable memory) also will be available almost immediately. Other peripherals promised are a direct connect modem, acoustic coupler, and 80-column thermal printer.

Pricing

The PX-8 with 64K, built-in CP/M, AC charger, CP/M utility ROM, Basic ROM, Portable WordStar ROM, Portable Calc/Scheduler ROM and four manuals is priced at $995. The disk drive is $599; 60K RAM disk, $329; 120K RAM disk, $460; direct connect modem, $180; acoustic coupler, $120; and thermal printer, $250. We think most people will want to get the basic unit with either a RAM disk or floppy disk drive, thus putting the total price between $1300 and $1600.

Is It Worth It?

I admitted to having mixed feeling about the PX-8 at the beginning. Some of my uneasiness stems from the eight-line display in the face of other manufacturers introducing 16- and 24-line displays. I understand that this was done to hold the cost of the basic unit under $1000, but is that really a magic price point?

Second, the PX-8 does lots more than the Model 100 and has a "real" operating system (CP/M 2.2) built in but this makes it more difficult to use. The machine has many novel features like the alarm/wakeup facility but it takes nine pages in the manual to describe how to use it. Motoring magazines sometimes say, "the controls fell naturally to hand"; the alarm/wakeup function most decidedly does not.

Facilities like the Password module sound wonderful if you want to protect your computer and files against use by "unauthorized" people. However, this feature is incredibly dangerous since once a password has been assigned, it is impossible to use the machine or remove the password without knowing what it is. Have you ever forgotten a familiar phone number? At least there are phone books; in the case of the PX-8 you have no recourse.

Lest I leave you with negative vibrations, I should say that in general I am most enthusiastic about the PX-8. There is no other computer under $1000 with comprehensive word processing and spreadsheet programs. The built-in microcassette recorder is a real plus, although I would still recommend a RAM disk or floppy disk drive. The unit is solidly built, and with the NiCad rechargeable batteries you need not buy stock in Duracell. If you don't yet have a notebook computer, be sure to give the PX-8 a close look. ■

CIRCLE 400 ON READER SERVICE CARD

WE'VE ELIMINATED THE HARD CHOICE IN SOFTWARE PACKAGES.

The performance of a good software program is the reason you buy a computer in the first place. Now, which programs should you buy?

The price range and the capacity of the programs on the market vary all over the lot. Worse: Higher price does not necessarily mean better performance.

How do you make a choice?

You read the ads in your favorite computer publication, like this one, but many of them are harder to understand than the program manuals.

You talk to your friendly computer store salesman. It is human for him to present you with the program he is most familiar with or the program with the most profit for the dealer. Don't blame him. Just ask about MEGAHAUS QUALITY SOFTWARE and ask him to compare us to the competition.

We can make computer program selection simple for you. Just visit your favorite computer store and ask to see a MEGAHAUS program. Our story is printed right on the package. If you compare our features with Brand X we've made a sale.

MEGAHAUS is dedicated to providing you with a competitively-priced Word Processor, Spelling Checker and Data Management System that work together for your Apple or IBM Computer. They do more, are less expensive, easier to use and offer friendly manuals that do not read like a college course in Advanced Gobble-de-gook.

Want more detailed information before going to the store? Just write us for our easy-to-read brochures and they'll come to you by return mail. No charge, no obligation.

The more you learn about software,
The more you'll choose

megahaus

WE MAKE COMPUTERS WORK HARDER.

MEGAHAUS CORPORATION/5703 Oberlin Drive, San Diego, CA 92121/(619) 450-1230

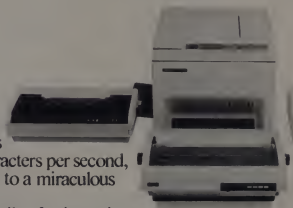
CIRCLE 158 ON READER SERVICE CARD

What type of printer should you buy?

Dot Matrix Printers.
At draft speed, characters come out crisp and clear, at up to 400 cps.

Dot Matrix Printers.
At correspondence quality speed, characters are so readable they make the term "computer printout" almost obsolete.

Ink Jet Printers.
Full color graphics and text capabilities make these some of the most versatile printers in the world.



It's a simple fact: Xerox has the widest range of printers in the world.

From dot matrix printers that can churn out 400 characters per second, to laser printers that run up to a miraculous 120 pages a minute.

Included in the Xerox family of printers is our Diablo® line, which many people consider to be one of the best in the world.

In fact, Diablo® daisywheel printers have been voted number one when it comes to brand preference,* but that should come as no surprise since we had a head start on the rest of the industry, inventing the daisywheel back in 1972.

Then, when you add our high quality, color

XEROX

Printer typography enlarged 40x

Daisywheel Printers.
We invented the category, and now it's the accepted standard among letter-quality printers.

Laser Printers.
The state of the art in high volume, whisper quiet high resolution electronic printing.

graphic ink jet printers to the list, and consider how most Xerox printers are IBM compatible, unusually quiet and reliable, it starts becoming obvious why Xerox is the type of printer you should buy.

So if you're in the market for a printer, call 1-800-833-2323, ext. 800, or your local Xerox office, or mail in this coupon. Once you do, you'll discover printers that are anything but typical.

*Source: *Datamation Magazine 1983 Brand Preference Study* of printer preference by end users and OEMs.

For more information, call 800-833-2323, ext. 800, or your local Xerox office, or mail in this coupon: Xerox Corp., Box 24, Rochester, New York 14692.

□ Please have a sales representative contact me.
□ Please send me more information.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____ CITY _____

STATE _____ ZIP _____ PHONE _____ 1234

XEROX and DIABLO are registered trademarks of XEROX CORPORATION.
CIRCLE 144 ON READER SERVICE CARD

A New Keyboard for the PC

Which One is Right For You?

Russ Lockwood

As the IBM PC moves into more and more offices, more and more touch typists are finding that the wonderful PC has a not-so-wonderful keyboard. We examined the replacement keyboards offered by several manufacturers and discovered that their approaches to solving the problems of the PC keyboard vary greatly.

Actually, we like many of the features of the IBM PC keyboard. It is detachable, which is a major improvement over other computer keyboards. Previously, manufacturers like Apple, Tandy, and Commodore made the keyboard an integral part of the system unit. IBM put the PC keyboard at the end of a six-foot coiled cord, which lets you hold the keyboard on your lap or just move it out of the way. In fact, you can argue that IBM started a trend, since most new computers now feature detachable keyboards.

We like the 10 function keys on the PC keyboard. Again, IBM was one of the first manufacturers to put separate function keys on the keyboard. We also like the separate numeric keypad, which makes for fast data entry. We think the keys are well-sculpted with a nice, solid feel, and the aural feedback is good and loud.

We also like the slant adjustment, which allows you to vary the angle of the keyboard. A nice extra feature is the ridge running across the top of the keyboard. This lets you prop a manual or book between the keyboard and system unit, a feature that can be very, very handy.

Unfortunately, the PC keyboard is far from perfect. Ironically, the PC does not conform to the now-standard IBM Selectric layout, and it aggravates touch typists no end. It places an extra key between the Z and Shift keys and locates the Return key slightly farther above the Shift key than most of us are used to. Why IBM did not follow the layout of their own successful Selectric typewriter keyboard remains a mystery.

What to Look For

The most important feature is the feel or touch of the keyboard. Touch refers to the tactile sensation you experience as you type. The IBM PC uses a hard touch, which is reminiscent of a typewriter; you must depress each key fully for a character to register. Other keyboards use a soft touch, which requires only a light tap to input a character. If you switch from a hard to a soft touch keyboard, plan on spending a few hours just to accustom yourself to this change.

If you are a touch typist, you will probably prefer a Selectric layout.

If you are a touch typist, you will probably prefer a Selectric layout. The misplaced backslash and Return keys on the PC keyboard will slow you down and cause a great deal of frustration. Also, look for word labels rather than cryptic arrows on the Return, Tab, Backspace, and Shift keys.

Sharing cursor control keys with a numeric keypad is adequate, but to manipulate the cursor with greater speed, a separate set of keys is far superior. Better yet, the cursor control keys should be in a logical diamond formation and special text editing keys, such as insert and delete, should be above or below the cursor controls.

LEDs on the Caps Lock and Num Lock keys are also desirable, as are raised bumps on the J and F keys and the 5 on the numeric keypad. An extra Return key on the numeric keypad helps speed data entry considerably.

Do not overlook the weight of the keyboard, especially if you use it on your lap most of the time. The PC keyboard is fairly heavy, and after using it for a few hours, you might feel that circulation to your legs has been cut off. A lighter keyboard reduces fatigue and is easier to move about.

For those with more esoteric tastes, keyboards with a Dvorak layout are available. Unlike QWERTY, the Dvorak layout places, from left to right, the A, O, E, U, I, D, H, T, N, S keys on the home row, with the common letters located near the stronger fingers. The result is that an accomplished Dvorak typist types faster than a QWERTY typist. However, a great deal of retraining is necessary to realize this speed advantage.

Frankly, most people have adapted to the idiosyncrasies of the PC keyboard because they had no other choice. But in this age of better mousetraps, several manufacturers are building keyboards to correct the problems of the PC keyboard.

Maxi-Switch 8505

The Maxi-Switch 8505 keyboard layout is an exact duplicate of the IBM PC keyboard, with the exception of LEDs on the Caps Lock and Num Lock keys. All the advantages and problems of the

Educational Software
That Works:

Spell.

Spell It!

Spell expertly 1000 of the most misspelled words. Learn the spelling rules. Improve with 4 exciting activities, including a captivating arcade game! Add your own spelling words.

ages 10 — adult / 2 disks: $49.95

Math.

Math Blaster!

Master addition, subtraction, multiplication, division, fractions, decimals and percentages — by solving over 600 problems. Learn your math facts with 4 motivating activities, including a fast-action arcade game! Add your own problems.

ages 6 — 12 / 2 disks: $49.95

Word.

Word Attack!

Add 675 new words to your vocabulary — with precise definitions and sentences demonstrating usage. Build your skills with 4 fun-filled activities, including an arcade game! Add your own words.

ages 8 — adult / 2 disks: $49.95

Read.

Speed Reader II

Increase your reading speed and improve comprehension! Six exercises designed by reading specialists vastly improve your reading skills. Chart your own progress with 35 reading selections and comprehension quizzes. Add your own reading materials.

high school, college & adult / 2 disks: $69.95

The Davidson Best Seller Tradition.

For your Apple, IBM or Commodore 64.
Ask your dealer today.

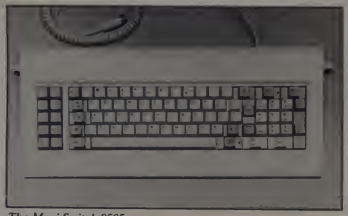
For more information call: (800) 556-6141
In California call: (213) 373-9473

Davidson & Associates
6069 Groveoak Place #12
Rancho Palos Verdes, CA 90274
CIRCLE 124 ON READER SERVICE CARD

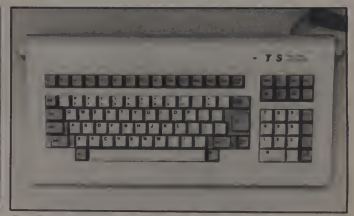
Davidson.

Teacher Certified NEA

Apple, IBM and Commodore 64 are trademarks respectively of Apple Computers, Inc., International Business Machines Corp., and Commodore Business Machines, Inc.



The Maxi-Switch 8505.



The Titan Data Systems Sure-Stroke.

PC keyboard layout are included.

The keys are well sculpted and the touch is good—not as hard as the PC but much firmer than a soft touch. The keys depress fully, although the throw is not as long as on the PC keyboard, and the distinct click of the PC keyboard is lacking. Overall, we liked the feel of the keyboard very much.

The main inducement for buying the Maxi-Switch is the weight. At 4.3 lbs, it is 16% lighter than the PC keyboard, which weighs in at 5.1 lbs, and it can sit comfortably on your lap for hours on end.

For those who leave the keyboard on the desktop, the Maxi-Switch has a three-position slant adjustment—one position more than the IBM PC keyboard offers. Maxi-Switch wisely kept the ridge along the top of the keyboard.

Maxi-Switch also manufactures the 8506 keyboard, which places the Shift and Return keys in their proper places, labels the Return, Tab, Backspace, and Shift keys, and adds a Return key on the numeric keypad. Maxi-Switch also makes the 8507, a Dvorak keyboard.

Titan Data Systems Sure-Stroke

After our use test, we were left with mixed feelings about the TDS Sure-Stroke. It had some nice touches which we'll mention later, but also some idiosyncrasies which we found awkward. Others may not. Read on.

We are convinced that the Sure-Stroke has the world's largest Return key—1.5" x 1.5" to be exact. Compared to the 1.5" x 0.5" Return key on the PC keyboard, this is huge. You cannot possibly miss this Return key.

Unfortunately, Titan did not label it as such, preferring to use a cryptic arrow. The Backspace, Tab, and Shift keys are nicely labeled, but not the Return key. Furthermore, the Return key could be better placed. Titan put the tilde (~) key directly above the Shift key. We would have prefered to find the tilde tucked underneath the backslash and Backspace.

Titan places the ten function keys across the top of the keyboard instead of on the lefthand side. If you are used to finding the function keys on the left, you must take time to get used to the change. In addition, the Num Lock, End, Pg Up, Dn, and Scroll Lock keys are also placed on the top—a clumsy arrangement at best.

The numeric keypad has a Return key, although like the giant main Return key, it is labeled with the cryptic arrow. Unfortunately, Titan did not place a raised bump on the 5 key, but did thoughtfully include a multiplication key on the keypad.

You need the dexterity of a concert pianist to move the cursor with any sort of speed.

Titan also includes separate cursor control keys, but they are located above the numeric keypad. This awkward placement makes these keys difficult to reach. You must reach over the numeric keypad to use the cursor controls, a clumsy procedure at first, but one to which we quickly become accustomed.

Although three of the cursor keys are in a logical half-diamond formation, the fourth is not. To make cursor control matters worse, the End, Page Up, and Page Down keys are with the function key grouping, located between the Num Lock and Scroll Lock keys. Again, this is awkward and clumsy. You need the dexterity of a concert pianist to move the cursor with any sort of speed.

Finally, the cursor control key grouping has an unmarked, undocumented key to the right of the right arrow. It does not print a character on the screen, move the cursor, or invoke a function, but every alternate press elicited a beeping sound. Frankly, we were baffled.

Then quite by accident, we discovered that the key turns the aural feedback, that beeping noise, on and off. After 10 minutes of typing with this arcade noise toggled on, we were searching for earmuffs. We were pleased to finally determine the function of this key, but it should have been labeled.

Fortunately, the normal keystroke click is subdued and absolutely marvelous. It is not as pronounced as the click on the PC keyboard, but it is reassuring and comes as close to optimum aural feedback as a keyboard can get. The tactile feedback is just as good. The keys require a firm press and have a nice, solid feel to them. We are very impressed with these facets of the Titan keyboard.

The Caps Lock key has an LED, but the Num Lock does not. Of all the keyboards we tested, only Titan features an on/off LED for the keyboard. It is a nice touch.

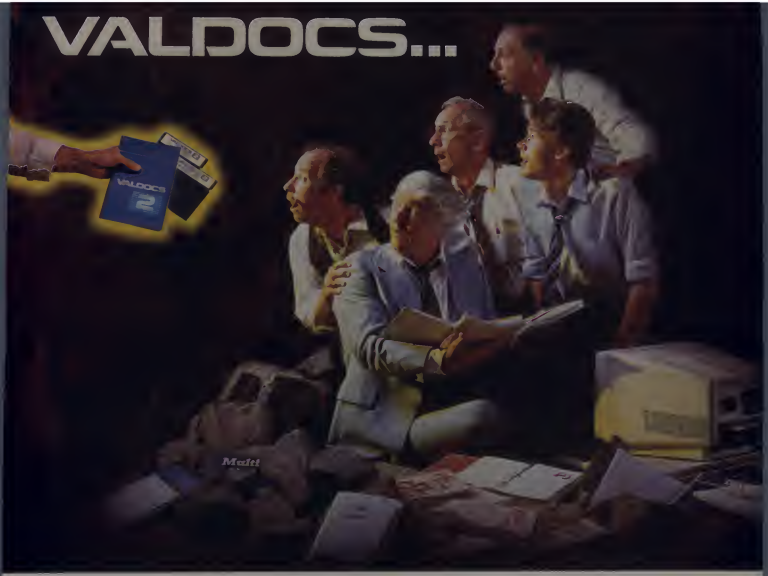
One Little, Two Little, Three Little Keyboards

Colby sent us an evaluation unit of its Key-2 plug-in keyboard. Unfortunately, after 15 minutes of use, it emitted a death squeal, the LED lights on the Caps Lock and Num Lock keys came on, and it refused to function. Back it went.

The second keyboard also lasted 15 minutes and died with two melancholy LED lights staring at us. That one also went back. At that point, a Colby spokesperson admitted that some of the boards were defective, but claimed the problem had been fixed.

With trepidation, we plugged in the *third* keyboard, which looked exactly like the other two, and booted up the PC. Eureka! It worked.

The Key-2 is the smallest of the keyboards we tested—just 15" wide, compared to the 19" width of the PC keyboard. It is also the lightest, weighing in at 3.5 pounds. This makes the Key-2



WELCOME TO THE INFORMATION AGE

You've been stuck in the "Stone Age" of computers for too long, wrestling with the same problems which have plagued users since the beginning — complexity, confusion and software which forces you to do things the computer's way.

Well, step out of the cave and into the dawn of a new age. *VALDOCS IS DIFFERENT...IT'S EASY TO USE.*

Valdocs was the first integrated software system. As such it marked the way out and other companies began to follow. But there's more to it than that.

Making it easy was the hard part. We studied people as much as computers, and discovered that for a feature to be useful, it must be *useable:* not just by computer-jocks, but by anyone.

NOW THE EASIEST TO USE SYSTEM ALSO HAS THE MOST FEATURES. First we made it easy. Now, after 18 months of development, *no system in the world offers more features than Valdocs 2.*

Just the list of integrated modules is amazing: wordprocessor, spreadsheet, appointment book, file indexer, mini-database, electronic mail system, address-book, mailing label system, business graphics package, optional drawing tools and much more...far too much to cover in an ad.

Ease of use coupled with enormous computing power. Sound too good to be true? It was...until now! *Valdocs 2 launches you into the Information Age.*

Phone toll free 1-800-CALL NOW, anytime, for a free 24 page color booklet describing Valdocs 2 in detail, and a free gift. Or check it out at your nearest Epson dealer.

Valdocs™ is available exclusively on Epson personal computers.

Epson QX-10 is a trademark of Epson America, Inc.

VALDOCS: *THE MOST IMPORTANT COMPONENT IS YOU.*

RISING STAR™

CIRCLE 184 ON READER SERVICE CARD

The Colby Key-2.

The Key Tronic KB 5151.

very easy to move around.

The Key-2 corrects most of the mistakes of the PC keyboard. The Shift and Return keys are in their proper places. The Caps Lock and Num Lock keys have LED lights. The numeric keypad, which doubles as cursor control keys as on the PC keyboard, has its own Return key. The Shift, Tab, Return, and Backspace keys are labeled with arrows and words.

Once you become accustomed to the feel and tap the keys instead of trying to press them through the bottom of the keyboard, you can type quite fast.

Colby places the 10 function keys and four extra cursor control keys across the top of the keyboard. Unfortunately, the extra cursor keys are arranged in a line rather than a logical diamond formation, diminishing their effectiveness.

That's Ergonomics

Unlike other keyboards, the Key-2 keys are enclosed on three sides by a three-quarter inch high wall. In theory, by running your hand along the ridge, you can find the extra cursor control keys in the top left corner, function key 10 in the top right corner, and the Return key on the numeric keypad on the righthand side of the keyboard.

In practice, the wall gives us keyboard claustrophobia—rather like typing in a box. Furthermore, we keep smacking the wall with our left hand, an especially aggravating constriction. After a few hours of typing, we were wishing the wall was not there. By the end of the day, we were ready to take a hacksaw to it.

The feel is adequate, although the keys do not seem as solid as on the PC keyboard. The aural feedback for the Colby keyboard is more subdued than that on the PC keyboard, but again, nothing special.

The Colby keyboard is not slant adjustable. Presumably, the thin profile of the Key-2 does not allow for spring-action legs. It does have three rubber feet on the bottom of the keyboard, which keep it rock steady on the table.

Key Tronic KB 5151

The Key Tronic KB 5151 is the largest of the four keyboards, measuring a whopping 20.25". With the extra space, it also offers the best layout of the keyboards, dividing the keys into four distinct groupings—alphanumeric, cursor control, numeric keypad, and a row of function and specialty keys.

The KB 5151 corrects the mistakes of the PC keyboard. The Shift and Return keys are located where they should be. The Caps Lock and Num Lock keys have LEDs. The Shift, Return, Tab, and Backspace keys are labeled with words, not arrows, and the F and J and the 5 key on the numeric keypad have raised bumps.

Unfortunately, Key Tronic places the Caps Lock key above the left Shift key and the Control key to the *left* of the Caps Lock key. You must make a mighty long stretch to reach the Control key with your pinky. The placement is awkward and clumsy, and for control key-intensive software, downright aggravating. In addition, one of our testers complained that with her fingers on the home row, she was unable to see the LED on the Caps Lock.

The tactile feel takes some getting used to. At first, the KB 5151 feels mushy because it has a very soft touch. However, once you become accustomed to the feel and tap the keys instead of trying to press them through the bottom of the keyboard, you can type quite fast. We are not saying you can double your typing speed, but the less effort and motion you need to expend, the faster you can type.

The numeric keypad doubles as cursor control keys. Key Tronic adds a Return key for fast data entry.

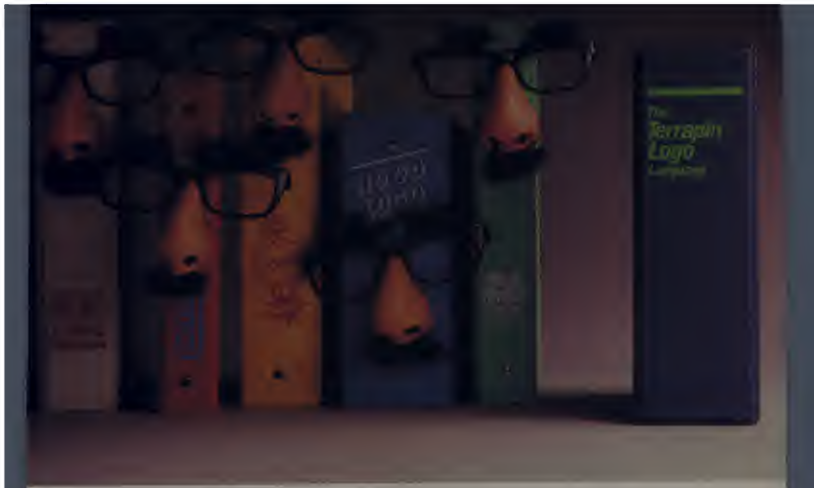
The dedicated cursor control keys are arranged in a logical diamond formation, with the Home, End, Page Up, and Page Down keys in the appropriate spots. The special editing keys, Insert and Delete, are above the cursor keys.

You must toggle the cursor keys on and off with a special Cursor Pad key. When the cursor keys are activated, the numeric keypad automatically switches to numbers. Thus, you use only one set of cursor keys at a time. We wonder why Key Tronic bothers to toggle the dedicated cursor control keys on and off. Not a big point, but we wonder.

The first question is whether you are dissatisfied with the IBM PC keyboard and want to switch to another.

The function keys are divided into two groups of five along the top. Next to them are a Pause key, Cursor Pad key, Print Screen key, a key with no name or purpose, and a Reset key. Note: you must hold the Control and Reset keys down to emulate the Control-Alternate-Delete sequence to reboot the system. You also must exert more force to depress the reset key than the other keys on the keyboard.

The KB 5151 is slant adjustable and has a ridge running along the top to



Beware of imitations.

There's only one Logo that can lay claim to being the original. And that's Terrapin™ Logo.

Terrapin is the original Logo developed at the Massachusetts Institute of Technology. It has been field-tested extensively. And it has been in use for over 10 years. Today, there are hundreds of thousands of satisfied Terrapin Logo users. That's because over 100,000 copies of Terrapin's Logo for Apple and Commodore microcomputers are in use.

Terrapin Logo is simple. And powerful. So, whether it's college or kindergarten, Terrapin Logo is the ideal Logo.

It's the best value your money can buy, too. For example, Terrapin is available for microcomputer networks, such as Corvus Omninet, PRO-NET and VIC-Switch. If you don't have access to networking, Terrapin Logo is available in money-saving 10- and 20-disk Terra-Paks for the Apple II family.

Being the original Logo also means we support you. Whenever you want, you can speak with our technical staff about whatever you want. Plus, we publish frequent enhancements to Terrapin Logo, and our award-winning documentation. Which means you can be assured that Terrapin is always the best Logo available.

To better understand why the original Logo is the best Logo, send for our free Reference Card. Or, if your school district has a microcomputer evaluation center, call for our special offer.

Terrapin Logo. It encourages exploration. It encourages learning. It's fun. And it's the original that keeps getting better.

Terrapin™

The Original Logo People

Terrapin, Inc., 222 Third Street
Cambridge, MA 02142, (617) 492-8816

CIRCLE 197 ON READER SERVICE CARD

There are Terrapin Logo versions for the Apple II family of microcomputers (with 64K RAM) and the Commodore 64 and Plus 4
Terrapin Logo is a registered trademark of Terrapin, Inc. Apple is a registered trademark of Apple Computer, Inc.
Commodore and VIC are registered trademarks of Commodore Electronics, Ltd.

prop up manuals and books. Key Tronic thoughtfully includes a 16-page operator's manual with the KB 5151.

Prices

The Maxi-Switch 8505, 8506, and 8507 carry a suggested retail price of $210. The Titan Data Systems Sure-Stroke costs $198. The Colby Key-2 sells for $260. The Key Tronic KB 5151 retails for $255.

Decisions, Decisions

All the keyboards we tested have advantages and disadvantages. The first question is whether you are dissatisfied with the IBM PC keyboard and want to switch to another. Keyboards are rather personal. Once you get used to one, it can be traumatic and time-consuming to adapt to another.

Another consideration concerns the plastic and cardboard templates that come with many of the most popular software packages. All of those templates are designed to fit around the 10 function keys on the IBM PC keyboard, and they will not fit the function keys as laid out on the Colby Key-2, Key Tronic KB 5151, or Titan Data Sure-Stroke. Only the Maxi-Switch 8505, which duplicates the PC keyboard exactly, can accommodate these templates.

Above all, your personal preferences should guide you in choosing an replacement keyboard. Soft touch, hard touch, standard layout, LEDs, separate cursor control keys—the options are available. You need only choose the features you want. The PC keyboard is adequate, but if you want a replacement keyboard, we are sure one of the four we tested—Maxi-Switch 8505, Titan Data Systems Sure-Stroke, Colby Key-2, or Key Tronic KB 5151—will satisfy your needs. ■

Manufacturer Addresses

Maxi-Switch
Century Research & Marketing Inc.
10800 Normandale Blvd., Suite 100
Bloomington, MN 55437
(612) 884-6363

Titan Data Systems Inc.
2625 S. Orange St.
Santa Ana, CA 92707
(714) 546-6355

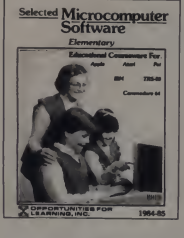
Colby Computer
849 Independence Ave.
Mountain View, CA 94043
(415) 968-1410

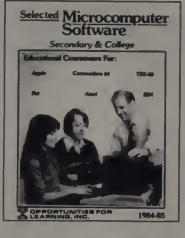
Key Tronic Corp.
P.O. Box 14687
Spokane, WA 99214
(509) 928-8000

RETAILERS TAKE NOTE

Create an educated and aware customer with *CREATIVE COMPUTING!* Every issue brings your customer new ways of using their microcomputer PLUS it's a "silent salesperson," helping users select new peripherals, software and hardware. If you're interested in a low ticket item that's efficient, effective *and* profitable, call us today! CALL 212-503-5380!

Or write: Ziff-Davis Publishing Company
Retail Sales Department
One Park Avenue—4th Floor
New York, NY 10016





From elementary spelling to advanced composition, basic math to calculus, beginning science to physics, Opportunities for Learning has the software you need. Write today for your free copy of the Selected Microcomputer Software catalog!

☐ ELEMENTARY EDITION ☐ SECONDARY EDITION

OPPORTUNITIES FOR LEARNING, INC.
8950 Lurline Ave., Dept. L87
Chatsworth, CA 91311
(818) 341-2535

Name _____
School _____
Address _____
_____

CIRCLE 170 ON READER SERVICE CARD

". . . this is a terrific package, whether for learning Pascal or for software development."

George Blank, *Creative Computing*, July, 1984

EXTENDED PASCAL FOR YOUR IBM PC, PC jr., APPLE CP/M MSDOS, CP/M 86, CCP/M 86 OR CP/M 80 COMPUTER

NOW . . . WITH WINDOWING (for IBM PC and Jr.)

$49.95

WHY ARE SO MANY BASIC PROGRAMMERS NOW USING PASCAL?

Pascal is structured. It's designed not to tangle. What a relief!

Many of us began programming in Pascal because more than once, we'd come smack up against Murphy's first laws of BASIC: GOTOS DON'T and GOSUBS **NEVER** RETURN!

You can name variables what you will. Instead of "R", you'll call your variable "RateOfSpeed". It makes sense. And its modular structure allows for the greatest ease of program maintenance.

Of course, some of the new BASICs have variations of these features, but, as anyone who's ever tried to write a game in BASIC knows, its an awfully slow language in execution. Programs written in Turbo Pascal run many times faster!

If you're wondering why BASIC has overshadowed Pascal until this year, the answer is really quite simple. BASIC, as I'm sure most of you know, comes "bundled" with almost every microcomputer it, therefore, became the "default" language.

In the past, to convert to a usable Pascal was, at the very least, an expensive proposition.

Our predecessors were costly ($300-$900), occupied huge amounts of disk space, and most required a separate editor. It's no wonder BASIC predominated for so long.

Therefore, until the introduction of Turbo Pascal, this powerful language remained a language of professionals.

Now, with the advent of Turbo Pascal, Pascal is a language for everyone who programs. It comes with a built-in editor, occupies only 33K of your precious memory and is menu-driven for true programming ease.

And Turbo Pascal compiles up to 97 times faster than any other Pascal compiler around! Yet, it offers all the features and extensions you've ever dreamed of, even a windowing procedure for the IBM PC!

If you're running a computer with PCDOS, MSDOS, CP/M, CP/M86, or CCP/M86, give yourself a treat . . . TURBO PASCAL!

As **Bruce Webster** said in *Softalk IBM* in March 1984,

"It is, simply put, the best software deal to come along in a long time. If you have the slightest interest in Pascal . . . buy it!"

To order your copy of Turbo Pascal 2.0 call:
For VISA and Master Card orders call toll free:
1 - 800 - 255-8008 In CA: 1 - 800 - 742-1133
(lines open 24 hrs. 7 days a week)

CIRCLE 106 ON READER SERVICE CARD

CHOOSE ONE (please add $5.00 for shipping and handling for U.S. orders)

___ Turbo Pascal 2.0 $49.95
___ Turbo Pascal 2.0 with 8087 support $89.95

If you have a 16 bit computer with the 8087 math chip—your number crunching programs will execute up to 10x faster!

Check _____ Money Order _____
VISA _____ MasterCard _____
Card #: _____
Exp. date: _____ Shipped UPS

My system is: 8 bit _____ 16 bit _____
Operating System: CP/M 80 _____
CP/M 86 _____ MS DOS _____ PC DOS _____
Computer: _____ Disk Format: _____
Please be sure model number & format are correct
NAME: _____
ADDRESS: _____
CITY/STATE/ZIP: _____
TELEPHONE: _____

BORLAND INTERNATIONAL
Borland International
4113 Scotts Valley Drive
Scotts Valley, California 95066
TELEX 172373

California residents add 6% sales tax. Outside U.S.A. add $15.00 (If outside of U.S.A. payment must be by bank draft payable in the U.S. and in U.S. dollars.) Sorry, no C.O.D. or Purchase Orders. F-12

Take our educat
home. And be a

America's schools need your help!

The publishers of America's number one educational program make you this unusual offer: Take any of our educational programs home and be a hero once, because kids love the fun we bring to learning. As a bonus we'll send the program of your choice to your school, free, including a gift card in your name. You'll help meet the acute need for superior software in our schools. You'll be a hero twice!**

The Scarborough System has a complete range of programs to stimulate, challenge and help you or your children be more productive—including Your Personal Net Worth, that makes handling home finances fast and easy, Make Millions, an adult business simulation game, and PictureWriter,* a program that makes drawing on the computer fun. At your dealer's now.

The Scarborough

©Scarborough Systems, Inc., 25 N. Broadway, Tarrytown, New York 10591

ional software hero twice!

MasterType™* Sharpen typing skills and increase computer facility. MasterType is the nation's best-selling educational program. It's an entertaining game that teaches typing as it increases the keyboard skills needed to be at home with a computer. And there's a bonus on top of this bonus: when we send a copy to your local school, at your request, your child will become even more proficient with a computer.

Run for the Money™ Learn to pursue profits in the real world by escaping from an alien planet. Here's an exciting different, action-packed game of business strategy for two players. Your children will have fun as they learn a lot about business.

Phi Beta Filer™* New for children and adults. Organizes lists of addresses, dates, insurance and medical records, hobbies and collections—even school work—structures quizzes on any subject, quickly and easily. (Not available for Atari.)

Songwriter™* Kids and adults will love making music at the computer. Just press a key to listen, press a key to record, and you've started your own composition. It's a fun way to learn about music. And Songwriter can be played through your stereo or computer.

*National Education Association Teacher Certified Software.

MasterType
Phi Beta Filer
GUIDE

PatternMaker.™ An amazing software program. It's geometry. It's art. It's great fun. Kids can build dazzling patterns and learn a lot. PatternMaker builds a foundation that can be applied to many professions and crafts. It challenges creativity and effectively teaches symmetry, color and design, and it's just as much fun for grown-ups, too.

Our programs are available for: IBM-PC/PCjr, Apple II family, Commodore 64, Atari.

You'll grow with us.

System.

CIRCLE 187 ON READER SERVICE CARD

CC10/84

Yes! I want to software a school!

**Enclosed is the completed warranty card and sales receipt for the purchase of a Scarborough product. I am enclosing my check for $3.50 to cover handling, shipping and postage required to send a free copy of a Scarborough program to the school listed below. A gift card with my name will be enclosed.

Your Name (for gift card)_____

Name of Principal_____

Name of School_____

Address (school address only)_____

City_____State_____Zip_____

Software will be sent only to verifiable school addresses.

Offer Expires Dec. 15, 1985

Check computer used in school:
☐ Comm. 64 ☐ Atari ☐ Apple II family ☐ IBM

Check product to be sent to school:
☐ MasterType ☐ Songwriter ☐ Phi Beta Filer
☐ PatternMaker ☐ PictureWriter† ☐ Run for the Money

† Apple only.

Make check payable and mail to:
Scarborough Systems, 25 N. Broadway, Tarrytown, N.Y. 10591

Reinventing the Wheel

Apple IIc Revealed

HARDWARE EVALUATION

Owen Linzmayer

The Apple IIc is like no other Apple computer ever introduced, and yet it is virtually an Apple IIe work-alike. The design of the IIc represents a change of philosophy for Apple. Gone are the expansion slots that hardware hackers loved. In fact, you can't even open the IIc easily. Apple has built a computer that is to be used as an applicance—like a telephone or a tape recorder.

The IIc is "aimed primarily at the consumer market," asserts John Sculley, President and CEO of Apple Computer. Will the IIc find a place in every home? There is no doubt in Apple's mind that the IIc will be their highest volume product ever. Will you be their next customer? Come, let's take a closer look so you can decide.

Package

The Apple IIc comes complete in one large box. For your hard-earned $1295, you receive a 128K Apple IIc with a built-in 140K disk drive, three instruction manuals, an external power supply, a set of five tutorial disks, and cables and adapters to hook the computer to a television set.

Physically the Apple IIc is one of the most appealing machines on the market. The sleek 12" x 11.5" x 2.5" case was developed by Hartmut Esslinger of Frog Design, the West German firm best known for designing the Sony Walkman. The ivory color, rounded edges, and high-performance look of the IIc have been dubbed the "Snow White" look and will be featured in all new Apple products. It is the look of the 80's, the Pepsi Generation, and you had better get used to it. You will be seeing a lot of it in years to come.

Keyboard

The layout of the Apple IIc keyboard is identical to that of the IIe, with the exception of the RESET key. Located to the right of the DELETE key on the IIe, RESET is found above the ESC key and is recessed into the case of the IIc. Directly to the right of the RESET key is the 80/40 switch which selects the number of columns of text to be displayed on the screen. The number of columns can also be selected by typing ESC-4 or ESC-8, though software can override the setting of the switch.

The keyboard is arranged in the popular QWERTY (Sholes) fashion but by pressing the keyboard switch, located to the right of the 80/40 switch, you can select the Dvorak layout which offers a much more efficient placing of keys. After switching to the Dvorak mode, you can pull up the keys and reinstall them according to the Dvorak layout. Apple plans to offer a set of Dvorak keycaps that will fit snugly over the existing keys and eliminate this shuffling.

The 63 keys can produce all 128 standard ASCII characters, which include upper- and lowercase alphanumerics, as well as 32 special graphics characters called Mousetext. The full-stroke keyboard offers good tactile feedback and an audible click. In addition, the D and K keycaps have small bumps on them to aid touch typists in correctly positioning their fingers on the home row.

Motherboard

The Apple IIc is testimony to the fact that you can re-invent the wheel and do a much better job the second time

Net Worth™ Your Personal

Its only business is managing your home finances. No program does it more quickly, more easily, more directly.

Your Personal Net Worth systematizes the management of your household income, expenses, credit cards and check books — using methods tested for accuracy by Touche Ross, one of the nation's leading accounting firms.

Your Personal Net Worth puts your computer to work, keeps your records straight, including your personal inventory of valuables and stock portfolio, tells you where and how you're spending your money or if you're making a shambles of your budget. And does it all in less time than it takes you to balance your check book.

Nothing else — no other program at twice the price — makes handling your personal money matters simpler, faster and more direct than **Your Personal Net Worth.**

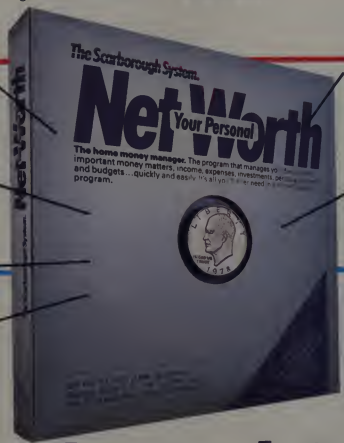
You'll find it at your favorite software retailer in the silver box with the real silver dollar on the front. It could be the single most valuable purchase you'll ever make.

Record all banking and any credit card transactions, reconcile bank statements instantly (up to 10 separate bank accounts can be handled), — print checks, too.

Set up a budget (as many as 350 categories) — and then compare your actual income and expenses to the budget.

Never forget a tax-deductible item. Today or at tax return time.

Display or print every financial report you'll ever need.


The Scarborough System.
Net Worth
Your Personal
The home money manager. The program that manages your important money matters, income, expenses, investments, and budgets...quickly and easily. It's all you'll ever need in a program.

Record stock, bond and other investment transactions. Inventory household valuables, collectibles and important papers for insurance and other purposes.

Your Personal Net Worth works fast because it's in machine language. Documentation in plain English is referenced for easy use. "Help" functions on screen at all times.

Available for:

IBM-PC/XT/PCjr (128K)
Apple II + /IIe/IIc (64K)
Commodore 64
Atari (48K)
The Program comes with two disks, one of which has accounts already set up for entry. However, only one disk drive is necessary.

The Scarborough System.

You'll grow with us.

© 1984, Scarborough Systems, Inc., 25 N. Broadway, Tarrytown, N Y 10591

CIRCLE 182 ON READER SERVICE CARD

A protective plastic layer makes this a "drool-proof" keyboard.

The IIc motherboard: an engineering masterpiece.

around. Thanks to large scale integration (LSI), the motherboard of the IIc is a masterpiece of engineering—40 custom integrated circuits do the work of well over 100 standard chips. For example, the Integrated Woz Machine (IWM) is a single chip that is equivalent to an entire Apple Disk II controller card.

Only five chips are mounted in sockets; the rest are soldered directly to the motherboard. This reduces costs tremendously and improves reliability. It also reinforces Apple's contention that the IIc isn't a machine for people who want to hack around with the hardware.

The heart of the Apple IIc is an 8-bit 65C02 microprocessor running at 1.02 MHz. The C stands for Complementary Metal-Oxide Semiconductor (CMOS) and means that the CPU draws significantly less power than a standard 6502 and, hence, produces less heat. These are important characteristics for a portable computer. The 65C02 is an enhanced version of the 6502 that has been the mainstay of the Apple II line, yet this new chip performs exactly the same when running the Ahl Benchmark Test. The improvements include 27 additional instructions which speed up graphics and allow for more efficient number crunching. These improvements may cause some compatibility problems (more on this later).

The IIc boasts 128K of on-board RAM which is equivalent to a IIe with an Extended 80-Column Card installed in slot 3. Since the 65C02 has an address range of only 64K, the second 64K of RAM is accessed via a process called bank-switching. According to Apple, the IIc is not expandable beyond 128K of RAM, but third-party developers have been known to do some surprising things with Apple hardware. I wouldn't bet against memory upgrades just yet. The IIc has 16K of ROM which includes the Applesoft Basic interpreter, the system monitor, and 80-column firmware less the diagnostics firmware of the IIe.

Disk Drive

Built into the righthand side of the IIc case is a half-height, 5.25", single-sided

The computer monitor so ingenious,
If you're torn between buying a dedicated monitor and making do with your regular TV, there's a smarter alternative. The General Electric Monitor/TV.
First and foremost, it's a computer monitor.
Compatible with all major computer brands, it combines these advanced features to sharpen text and graphics and deliver a display that's easy-on-the-eyes: Direct and split video inputs; 320-line resolution via a comb filter; plus a computer grade, 5mm-pitch Neovision™ picture system.
For the name of your nearest dealer, call The GE Answer Center™ Information Service, 1-800-626-2000

floppy disk drive. This drive has a 140K formatted storage capacity, of which 124K is available with DOS 3.3, and 137K is available for Pascal and ProDOS users. Thanks to the flexibility of ProDOS, third-party external drives may offer storage capacity in excess of 140K.

The built-in drive is treated as if it were drive 1, in slot 6 of a IIe. The optional external Apple drive ($329) is referenced as drive 2, slot 6. Apparently you will never be able to run more than two floppy disk drives on an Apple IIc, but if it is more on-line storage that you desire, Quark Inc. of Denver has announced a 10Mb Winchester hard disk drive for the IIc called the QC10. The 19-pin D-type connector for the second drive on the back of the IIc contains most of the pinouts to the internal bus, so if memory expansion units or CP/M modifications are ever designed, they will probably plug in here.

Serial Ports

The IIc has two built-in serial ports located on the back of the unit. These ports are analogous to two Super Serial cards for the IIe. The 5-pin DIN serial connectors are keyed and labeled with icons to eliminate the possibility of connecting a cable incorrectly. Serial port 1 is to be used primarily for output to printers and plotters. You are limited to using only serial printers unless you purchase a serial-parallel adapter unit, several of which are already on the market with prices ranging from $129-$199. The second serial port is devoted to communications using an optional modem.

You may configure the ports to your liking using the system utility disk supplied with the IIc. Parameters such as word length, bit rate (baud), parity, echo output, linefeed, carriage return, and line length are user-definable. Along with the printer and modem presets, your custom configurations can be saved to and recalled from disk, thus eliminating repetitious setting of parameters.

The most commonly voiced complaint concerning the Apple IIc is the lack of expansion slots, which some people take to mean a lack of expandability. Not so. There are many devices that may be attached directly to the serial ports. These include port extenders, home controllers, print buffers, real-time clocks, music systems, sound effects generators,

HARDWARE PROFILE

Product: Apple IIc
Type: Desktop/portable
CPU: 65C02
RAM: 128K/128K
ROM: 16K
Type of Keyboard: 63-key half-stroke
Text Resolution: 80 x 24
Graphics Resolution: 560 x 192
Number of Colors: 16
Sound Capability: Internal speaker with volume control
Ports: Two serial, second drive, video expansion, hand controls/mouse
Dimensions: 2.25" x 11.5" x 12"
Documentation: Four tutorial disks and manuals for neophytes
Summary: The home computer of the Pepsi generation.
Manufacturer:
Apple Computer, Inc.
20525 Mariani Ave.
Cupertino, CA 95014
(408) 996-1010

it even runs this kind of program.
Secondly, it's a first class TV.
Flick a switch and these same advanced electronics give you an outstanding TV, with a high-contrast picture and rich, true colors.
And you get all this for about the same price as an ordinary monitor. Another piece of ingenuity we thought you'd appreciate.
We bring good things to life.
Simulated Monitor/TV Picture.
A TRADEMARK
1984
CIRCLE 143 ON READER SERVICE CARD

and speech synthesizers (see sidebar).

The lack of slots is really a blessing in disguise. It makes the IIc a "closed system." This is the kind of environment for which software developers like to program, since they don't have to worry about all the different cards and hardware kits that you may or may not have in your computer. With a closed system, if the program runs correctly on one IIc, it runs correctly on every IIc. I anticipate that software firms will flock to the IIc. This machine is a programmer's dream—a powerful closed system with a wide range of special features.

Video Output

There are two video output connectors on the back of the IIc, an RCA phono jack and a 15-pin D-type connector. Using the supplied radio frequency (RF) modulator and switch box, you can use your television set as a display. The modulator, as well as external PAL and SECAM video adapters for overseas use, get their signals from the video expansion connector.

If you want to take advantage of 80-column text or double high-resolution graphics, you will want a composite video monitor. The RCA jack provides the NTSC signal required by both color and monochrome composite monitors. Monochrome monitors are best for crisp displays of alphanumeric information, but don't do justice to color graphics. The reverse is true for color monitors.

If you want both 80-column text and color graphics, you should get a red-green-blue (RGB) monitor. These are expensive ($600+), but the superb picture quality justifies the cost. In addition to the monitor itself, you will need to purchase an RGB adapter for the Apple IIc for about $200.

Perhaps one of the most desirable peripherals for the IIc is the flat-panel liquid crystal display (LCD). Weighing in at 2.5 lbs and measuring a trim 11.5" x 6" x 1.5", the display has a resolution of 560 x 192 bit-mapped pixels. Since each text character is composed on a 7 x 8 matrix, the LCD panel is capable of displaying a full 80 columns by 24 rows of normal, inverse, flashing, and Mousetext characters. The flat-panel display also has full graphics capabilities, including the much touted double high-resolution graphics. All but the fastest and most detailed animated graphics will be within the capabilities of the flat-panel display. Unfortunately, the projected lofty $600 pricetag makes the LCD panel a peripheral for the few rather than the masses.

This machine is a programmer's dream—a powerful closed system with a wide range of special features.

Controller Port

Looking at the rear of the IIc, the controller port is located at the far left. This 9-pin D-type connector is where hand controllers plug into the IIc. Joysticks designed to use the 9-pin controller port of the IIe are 100% compatible with the IIc, but controllers that connect to the internal 16-pin game socket cannot be used without a special adapter.

Other peripherals that use the controller port are mice, paddles, light pens, and port extenders. As software programmers begin to take full advantage of the IIc Mousetext features, a mouse may become a necessity. Packaged with the $99 AppleMouse IIc is *MousePaint*, Bill Budge's adaptation of the incredible Macintosh drawing program, MacPaint. Few programs currently on the market allow mouse input, but you should expect to see many new releases that do.

Instead of a traditional X-Y pointing device, the mouse can be used as a paddle controller if your Basic program uses PDL functions to read the paddles. To use the mouse instead of the paddle, boot DOS 3.3, type PR#4 to turn on the mouse, then type CTRL-A to initialize it, and finally, type PR#0 to restore output to the screen.

Audio Output

The Apple IIc has an internally mounted 1⅜" speaker located on the bottom front of the unit. This speaker is slightly smaller than those used in the Apple II line to date, but it provides a comparable response. Luckily, there is a volume control dial on the lefthand side of the IIc, along with a two-channel, monaural, mini-phone jack to accommodate headphones. When the headphones are plugged in, the internal speaker is disconnected.

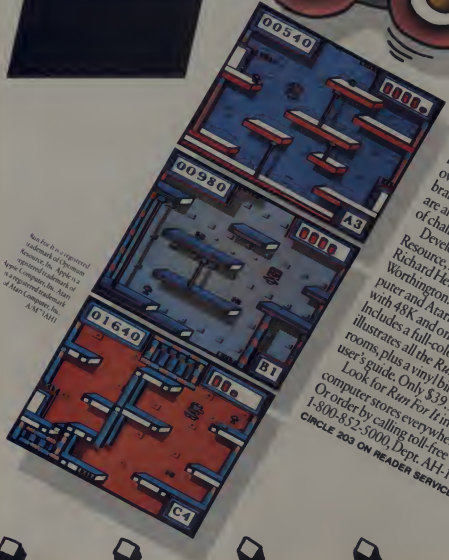
Power Supply

One of the most interesting things about the IIc is that it actually has two power supplies: one internal and one external. The 10 lb. external supply is referred to as the floor board unit and comes with a 12' cord. This unit draws a negligible amount of power even when the IIc is turned off, and due to its large size, it dissipates heat rather well.

The floor board unit converts 110V AC from a wall outlet to 15V DC which can be used by the internal power supply. The fact that the computer itself runs on 15V DC allows the IIc to be powered from a car cigarette lighter socket or equivalent power source. If you are on the run, Diswasher sells

The Apple IIc replete with its family of peripherals.

Run For It™



Can you help ORBIT the Robot flee from room to mazelike room in his daring, thrill-a-second effort to escape the bad guys? With *Run For It's* amazing 3-D effect, you'll want to step right inside the screen to make sure ORBIT reaches the end of his dangerous journey!

You can make ORBIT bounce up or scrunch down as he climbs from level to level in order to avoid his enemies—and fires powerful missiles of his own! The special effects on this brand-new arcade-like game are amazing—and a new kind of challenge for game players.

Developed by Optimum Resource, Inc. Designed by Richard Hefter and Steve Worthington. For Apple® Computer and Atari® Computers with 48K and one disk drive. Includes a full-color poster that illustrates all the *Run For It* rooms, plus a vinyl binder and user's guide. Only $39.95 each.

Look for *Run For It* in finer computer stores everywhere. Or order by calling toll-free 1-800-852-5000, Dept. AH-1

CIRCLE 203 ON READER SERVICE CARD

Run For It™
Weekly Reader Family Software
A division of Xerox Education Publications
Middletown, CT 06457

Run For It is a registered trademark of Datamost. Apple is a registered trademark of Apple Computer, Inc. Atari is a registered trademark of Atari Computer, Inc. AM-7881

Cari, a $250 carrying case with a built-in battery pack that provides three to five hours of uninterrupted use without a charge. Equipped with Cari and the flat-panel LCD display, the IIc becomes a very powerful portable computer.

Documentation

Three manuals are supplied with the Apple IIc. They are probably the best computer manuals ever written—for beginners. "Setting Up Your Apple IIc" explains simply and thoroughly how to get your computer out of its box and into operation. "Apple Presents the Apple IIc" is a 144-page spiral-bound interactive introduction to the IIc. It is to be used in conjunction with the four tutorial disks supplied with the system, though it can stand alone if need be.

"Systems Utilities" is a manual that describes the various functions and parameters of the powerful utilities disk included with the computer. The system utilities disk is ProDOS-based, yet the disk management commands contained therein allow it to read Pascal and DOS 3.3 disks.

Unfortunately for hackers and advanced users, detailed descriptions of Applesoft Basic, DOS references, system information, and technical specifications are not supplied with the IIc system. Several independent publishers have released IIc books, but beware, most of these do little more than reiterate the Apple manuals and press releases.

Compatibility

One of the strongest selling points of the IIc is that it is compatible with the more than 10,000 Apple software programs already on the market. There are, however, many packages that are not fully compatible. The reasons for incompatibility vary. What follows

Apple Computer plans to sell 500,000 IIc's in 1984 alone.

is a description of the most common problems.

Software that makes calls to the alternate inverse character set in ROM will boot correctly, but will display strange Mousetext characters instead of the intended text.

If an Apple disk refuses to boot on a IIc, but works fine on other II computers, it probably has a special protection scheme common on entertainment packages. Spiral, synchronous, and half-tracking protection techniques rely on certain Apple Disk II drive idiosyncrasies that are not present in the IIc drives.

Any software that simply "hangs" in operation probably makes use of previously unused memory locations that were reserved for Apple's future use. Programs that rely upon 80-column boards manufactured by third-party vendors will not work correctly either.

All of these problems can be solved by rewriting the code, at which time the software manufacturers can take advantage of special IIc features such as 80/40 columns, 128K RAM, double high-resolution graphics, and mouse technology. I suspect that any existing incompatibilities will be reconciled shortly and that in the future all Apple software introduced will pay special attention to the IIc. As it stands, 80 to 95% of all Apple programs currently available work on the IIc, but the only way to make sure that the program you want functions correctly is to try it yourself at your local Apple dealer.

Apple Computer plans to sell 500,000 IIc's in 1984 alone. Will they make it? Who knows. One thing is for sure: they can count on my order. Although we at *Creative Computing* review several computers a month, I was so impressed with the IIc that I went out and bought one for myself. If you are looking for an Apple-compatible machine and are not too concerned with the fact that the IIc is slotless, this is the computer for you. If, however, you really want expansion slots, pick up a IIe. Either way, you can't lose. ■

CIRCLE 402 ON READER SERVICE CARD

Apple IIc-Specific Peripherals

Brady Communications Co., Inc.
Bowie, MD 20715
(800) 638-0220
Apple IIc User Guide $14.95

Chalk Board, Inc.
3772 Pleasantdale Rd.
Atlanta, GA 30340
PowerPad $149

Diswasher
1407 N. Providence Rd.
P.O. Box 6021
Columbia, MO 65205
(314) 449-0941
Cari carrying case with
battery pack $249.95
Calling Four II $79
Serial-Parallel interface $129

Howard W. Sams & Co., Inc.
4300 W. 62nd St.
P.O. Box 7092
Indianapolis, IN 46206
(800) 428-SAMS
Introducing the Apple IIc $12.95

Koala Technologies
(800) KOA-BEAR
Koala Pad $125
Gibson Light Pen System $249

Pocket Books
Going Places With the New Apple IIc
$3.95

Prometheus Products, Inc.
45277 Fremont Blvd.
Fremont, CA 94538
(415) 490-2370
Versabox serial-parallel interface $199

Quark
2525 W. Evans, Suite 220
Denver, CO 80219
(303) 934-2211
QC10 hard disk drive less than $2500

So. Calif. Research Group
P.O. Box 2231-A
Goleta, CA 93118
(800) 635-8310
9-16 Game Port Adapter $14.95

Street Electronics
1140 Mark Ave.
Carpinteria, CA 93013
(805) 684-4593
The Cricket $179.95

Sweet Micro Systems
50 Freeway Dr.
Cranston, RI 02920
(800) 341-8001
Mockingboard D $195

TG Products
1104 Summit Ave.
Plano, TX 75074
(214) 424-8468
Apple II Joystick $44.95

Video-7 Inc.
12340 S. Saratoga/Sunnyvale Rd.
Suite 1
Sunnyvale, CA 95070
(408) 725-1433
IIc RGB Interface $195

Wico
6400 W. Gross Pl. Rd.
Niles, IL 60648
(800) 323-4014
Analog Joystick $49.95

INSTANT FUN.

Now everyone can make music.

Skip the years of piano lessons. Months of struggling to read sheet music—forget it! Music should be easy, and as fun to make as it is to listen to. Now, with some help from your Apple, it is!

Just pop an ALF Music Card into your Apple, and plug the card's cable into your stereo system. Boot the disk, and WOW! Incredible music leaps from your speakers—you've never heard music like *this* out of a computer. Remember 2- or 3-note chords coming from that tiny speaker in your Apple, like the sound from an old pay phone? Now imagine 9-note chords, hi-fi digital sound, and ADSR-timbres just like Moog used to make—all dancing out of your system in glorious stereo! Rapture! Ecstasy!!

But now the *real* fun begins. Use the Music Entry program to put in your own songs. Just match the symbols in the sheet music with the ones on the screen. Or make up your own songs—each note is played as you put it in. Changing notes, inserting new notes, and deleting extras is a breeze. Editing is so fast and easy you'll be adding frills just for kicks.

The Music Card goes beyond having a good time. Even professional musicians love its advanced abilities. Change volume, timbre, and tempo at any point in the music. Triplets, quintuplets, sixty-fourth notes and faster? No problem. Rounds, repeats, D.C. al Fine, al Segno, al Segno e poi la Coda... any repetition you can imagine is simple. Transposition in quarter-steps. Full ADSR envelopes. The Music Card does it all.

So pour some music in your Apple. $169 at your Apple dealer, or call 1-800-321-4668 (in Colorado, 1-303-234-0871). And start having fun. Instantly!

The Music Card model MC1 plugs in your Apple //, //+, //e, or ///. Game paddles required for the // and //+, recommended for the //e. "Apple" is a trademark of Apple Computer

ALF ALF Products Inc. 1315F Nelson St. Denver, CO 80215 Telex: 4991824

Introducing the most powerful

The new IBM Personal Computer AT.

Hold on to your hat.

The new IBM Personal Computer AT (for Advanced Technology) is based on the advanced 80286 16-bit microprocessor. This remarkable computer will run many of the programs written for the IBM PC, up to three times faster. You'll be able to recalculate large spreadsheets in seconds and retrieve files in a flash.

It's got the power (and price) to surprise you. In many ways.

Compatibility, expandability, networking too.

With the IBM Disk Operating System, the IBM Personal Computer AT can use many programs from the fastest-growing library in the personal computer software industry.

The IBM Personal Computer AT is also available with up to 3 million bytes of user memory to run multiuser, multitasking operating systems such as XENIX™. Volume upon volume of information is available at your fingertips. You can customize your system to store up to 20,000 pages of information at one time. And its keyboard helps you use all of this computing power more easily.

This new member of the IBM PC Family is a powerful stand-alone computer that can also be both the primary file server and a station on your network. With the new IBM PC Network (which is so easy to connect you can do it yourself), the IBM Personal Computer AT can share information with IBM PCs, PC/XTs and IBM *Portable* PCs.

IBM Personal Computer AT Specifications

User Memory
256KB-3MB*

Microprocessor
16/24-bit 80286*
Real and protected modes*

Auxiliary Memory
1.2MB and 360KB diskette drives*
20MB fixed disk drive*
41.2MB maximum auxiliary memory*

Keyboard
Enlarged enter and shift keys
84 keys
10-foot cord*
Caps lock, num lock and scroll lock indicators

Display Screen
IBM Monochrome and Color Displays

Operating Systems
DOS 3.0, XENIX*

Diagnostics
Power on self-testing*
Parity checking*
CMOS configuration table with battery backup*

Languages
BASIC, Pascal, FORTRAN, Macro Assembler, COBOL, APL

Printers
Supports attachment of serial and parallel devices

Permanent Memory
(ROM) 64KB

Clock/calendar with battery*

Color/Graphics
Text mode
Graphics mode

Communications
RS-232 C interface

Networking
High performance, high capacity station on the IBM PC Network*

*Advanced Features for Personal Computers

Get a hands-on, hats-off demonstration.

The new IBM Personal Computer AT has the power, compatibility and expandability many PC users need, at a very appealing price.

For more information contact your authorized IBM PC dealer, IBM Product Center or IBM marketing representative. For a store near you call 1-800-447-4700. In Alaska or Hawaii call 1-800-447-0890.

IBM®

personal computer IBM has ever made.

Little Tramp character licensed by Bubbles Inc., s.a.
XENIX ® is a registered trademark of Microsoft Corporation.

CIRCLE 150 ON READER SERVICE CARD

Acorn

A Tall Oak in Education

John J. Anderson

You may have heard it said that big oaks from little acorns grow. In the case of the Acorn microcomputer, the proverb is most certainly true. The Acorn has already grown into a mighty oak on the far side of the Atlantic, where it is the most popular educational machine in the United Kingdom.

Certainly having been chosen as the official micro of the BBC (British Broadcasting System) helped it achieve this status. But it was not the fact of having been chosen that made the Acorn grow. It was the quality of the Acorn that caused it to be chosen. Follow?

When you stop to think that the Acorn computer has been in production abroad since 1981, you might think to credit the excellence of its design. Though the original Apple II was shipped with more or less the same design for a record-setting seven years, it is out of production now. The Acorn is still selling well today with an original design dating from 1981. No other machine can make that impressive claim.

Why? Well, it isn't enough just to say the designers had foresight or that their commitment to quality was admirable, though both of those statements are indeed true. The heart of the matter is that the Acorn was designed with a calculated, highly specific goal in mind: to be an educational tool. On that account it succeeds masterfully.

The Acorn is, in fact, built like an oak. It is designed to withstand "institutional" punishment, to offer ease of use without sacrificing the goal of furthering computer literacy, and to present powerful ROM software tools to the beginning programmer.

Quick Tour of the Hardware

The Acorn is built around a 6502 processor with 32K of RAM and 32K of ROM. In ROM you'll find a variation of Microsoft Basic and a powerful machine code assembler, along with other routines.

Graphics are superlative, with an RGB interface standard (the Acorn was among the first RGB color micros). It sports eight graphics modes: 16 simultaneous colors in 256 x 160 pixel resolution and 840 x 256 pixel resolution in two colors. Graphics

A LITTLE SPIRIT CAN GIVE YOU EXTRAORDINARY PRINTING POWER.

Spirit's the microprinter that lets you do more things yourself. And do each of them letter perfect.

It prints standard, bold, expanded and condensed type faces. Even *italics*. And finely etched graphics. All because every impression has a crisp, square edge to it for unmistakable clarity.

That's the power to look perfect in print.

And a power that operates almost without sound. The Quietpak option smothers printer noise. So Spirit rushes through work with barely a whisper.

There's also the power to manage paper. Variable width tractors adjust for narrow jobs like labels. Or wider jobs like correspondence. All of which are handed to you immediately thanks to Spirit's Quick Tear edge.

When you can have your own personal microprinter that does so much for so little, aren't you powerless not to act?

For more information and the name of your nearest dealer, call toll-free: **800-447-4700**. In Illinois, **800-322-4400**.

MANNESMANN TALLY

In Canada, call 417-661-9783 *Manufacturer's suggested U.S. retail price with parallel interface

CIRCLE 136 ON READER SERVICE CARD

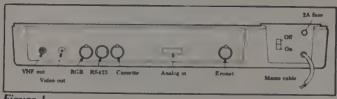


Figure 1.

Figure 2.

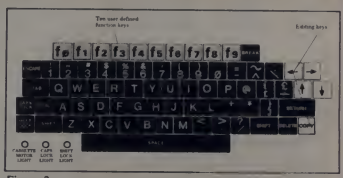

Ten user defined function keys
Editing keys
f0 f1 f2 f3 f4 f5 f6 f7 f8 f9
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
SHIFT
SHIFT LOCK LIGHT
CAPS LOCK LIGHT
CASSETTE MOTOR LIGHT
SPACE
COPY

Figure 3.

housekeeping is handled by a custom LSI chip.

Sound capabilities include four channels: three for tones and one for noise. Sound quality rivals the Apple II series, with a small speaker internal to the machine. In fact many things about the Acorn will remind you of the Apple II, including its case. The designers of the Acorn certainly used the Apple as at least a partial prototype.

As opposed to the Apple, however, the Acorn presents a number of interfaces standard and has no need for internal card slots. Disk interface, parallel printer port, three types of video output (RF mod, composite, and RGB), RS-423 serial, and Econet interface are all standard on the Acorn. See Figures 1 and 2.

Also standard equipment are a ROM cartridge slot, a 1MHz bus, and another bus dubbed the "Tube." This bus makes the addition of a coprocessor possible—putting the Acorn under control of a Z 80 running CP/M, for example. The idea is that the CPU of the Acorn should never really go out of date, as long as the Tube is around. Acorn is planning a 68000 coprocessor option now, we have heard.

Econet is a communications networking system that allows up to 254 machines to be linked using standard four-wire telephone cable. This low-cost capability is of great interest to educators.

The keyboard layout of the machine is standard QWERTY, though a few of the keys are placed eccentrically (Figure 3). One of the most annoying placements I have encountered is the backspace key on the lower right, and that is exactly where it appears on the Acorn. The layout is non-Selectric, placing the quote as a SHIFT-2 and the apostrophe as SHIFT-7. It takes a bit of getting used to, unless it is what you have been using. There are nine programmable function keys across the top of the machine.

As I mentioned earlier, the Acorn is built to withstand the abuse of the classroom. I cannot recall having seen a sturdier computer. If you are purchasing micros for elementary school use, your machines will be subject to extremes of torture. The Acorn is ready to stand up to that for years.

HARDWARE PROFILE

Product: Acorn

Type: Microcomputer

CPU: 6502

RAM: 16/32K

ROM: 32K

Type of Keyboard: 74-key full-stroke QWERTY, 10 function keys

Text Resolution: To 80 x 24

Graphics Resolution: To 840 x 256

Number of Colors: 16

Sound Capability: 4 channel—3 tone, 1 noise

Ports: Cassette, parallel printer, RS-423, Econet, User I/O, twin custom busses.

Documentation: Excellent

Summary: As a machine designed for schools and to be used for education at home, the Acorn succeeds magnificently.

Manufacturer:
Acorn Computers Corp.
400 Unicorn Park Dr.
Woburn, MA 01801
(617) 935-1190

Quick Tour of Basic

Why Basic in the Acorn, you ask? Why not Logo or Comal? Well, we must remember that the Acorn was originally designed back in 1981. Even then it was debated whether Basic was the best beginner's language, and there was much disagreement in British academic circles. Basic finally won out, probably because it was already in development for the machine (originally called the Atom) when the BBC chose to back it.

Acorn Basic is much like Microsoft Basic, with a few notable differences. Those differences will not mean much to students learning Basic for the first time, but they make transporting programs somewhat difficult. On the other hand, Acorn Basic has some neat special commands, like REPEAT...UNTIL and a host of dedicated graphics and sound commands. The command ENVELOPE, for example, allows you to define the shapes of sound envelopes for the three tone voices available.

Other Software

Acorn software developed on these shores was scant up until the beginning of 1984, when many packages began to appear. Acorn has set up a qualified review panel to ensure that Acorn educational packages will conform to a high standard of quality. We made a random sampling of six Acorn/Shiva math packages, along with educational packages from Krell and Acorn itself, and found them quite satisfactory. Acorn tells us that hundreds of packages, including a powerful version of Logo, are now available.

Documentation

But the Acorn is never a better learning machine than when it is teaching computer literacy. The two-volume User's Guide accompanying the machine is among the best Basic tutorials available. It is clear, unpatronizing, well-paced, thorough, and above all, logically consistent. If you want to learn Basic, or have a youngster who wants to, the Systems User Guide would be a very good place to start.

Bottom Line

Things change very swiftly in the world of micros, and I have taken to calling six months a generation. The Acorn has been around for seven micro generations now and is still going strong.

I would have liked to have seen the introduction of the machine to the U.S. long before the beginning of this year—it might have pre-empted the inappropriate purchase of many machines less suited to use in education. Now that the Acorn is here, it has already found a niche among smart educational buyers.

The Acorn lists for $999 retail with built-in cassette storage port. A 5.25" disk drive unit with controller lists for $599. ■

CIRCLE 403 ON READER SERVICE CARD

BIG FOUR

NEW 128K —MEGA BYTE DUAL DISK DRIVE—80 COLUMN

COMPUTER SYSTEM SALE!

HOME • BUSINESS • WORD PROCESSING

List Price $3717.95

LOOK AT ALL YOU GET FOR ONLY $895.

		LIST PRICE
①	B128 COMMODORE 128K 80 COLUMN COMPUTER	$ 995.00
②	8050 DUAL DISK DRIVE (over 1 million bytes)	1795.00
③	4023 100 CPS 80 COLUMN BIDIRECTIONAL PRINTER	499.00
④	12" HI RESOLUTION 80 COLUMN GREEN OR AMBER MONITOR	249.00
•	BOX OF 10 LORAN LIFETIME GUARANTEED DISKS	49.95
•	1100 SHEETS FANFOLD PAPER	19.95
•	ALL CABLES NEEDED FOR INTERFACING	102.05
	TOTAL LIST PRICE	$ 3717.95

$895. SALE PRICE

Printer replacement options (replace the 4023 with the following at these sale prices)

	LIST	SALE
• Olympia Executive Letter Quality Serial Printer	$ 699.00	$ 399.00
• Comstar Hi Speed 160 CPS 15" Serial Business Printer	$ 779.00	$ 499.00
• Telecommunications Deluxe Modem Package	$ 199.00	$ 139.00

Plus You Can Order These Business Programs At Sale Prices

	LIST	SALE		LIST	SALE
Professional 80 Column Word Processor	$149.95	$99.00	Payroll	$149.95	$99.00
			Inventory	149.95	99.00
Professional Data Base	149.95	99.00	General Ledger	149.95	99.00
Accounts Receivable	149.95	99.00	Financial Spread Sheet	149.95	99.00
Accounts Payable	149.95	99.00	Program Generator	149.95	99.00

15 DAY FREE TRIAL We give you 15 days to try out this SUPER SYSTEM PACKAGE!! If it doesn't meet your expectations just send it back to us prepaid and we will refund your purchase price!!
90 DAY IMMEDIATE REPLACEMENT WARRANTY If any of the SUPER SYSTEM PACKAGE equipment or programs fail due to faulty workmanship or material we will replace it IMMEDIATELY at no charge!!

Write or Call For Free Catalog and Spec Sheets!!

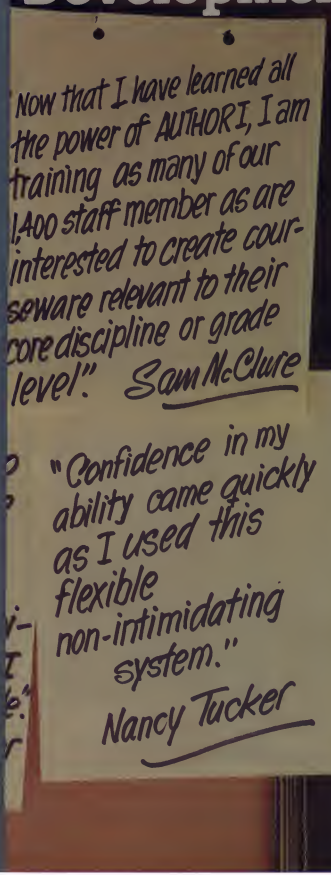
Add $50.00 for shipping and handling!!
$100.00 for Canada, Puerto Rico, Hawaii orders.
WE DO NOT EXPORT TO OTHER COUNTRIES
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders. 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and MasterCard. We ship C.O.D. to U.S. addresses only.

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS!)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

CIRCLE 177 ON READER SERVICE CARD

Read What Educators Are
New Courseware
"The design of the training course provided a well-balanced combination of hands-on workbook activities."
Dr. Charles S. Cline
"The AUTHOR I workshop was well conducted and proved beneficial in learning simplified techniques for creating educational software"
Louise Fulgham
"I like the idea of easily creating courseware and being able to concentrate on content rather than programming."
Deborah Sinkis
"The course proved to be most informati
and would be very beneficial to other teachers. The possi
lities which AUTHOR
open up are innumera
Mary Jane Frazi

Saying about Radio Shack's Development Seminar


"Now that I have learned all the power of AUTHOR I, I am training as many of our 1,400 staff member as are interested to create courseware relevant to their core discipline or grade level." Sam McClure
"Confidence in my ability came quickly as I used this flexible non-intimidating system."
Nancy Tucker

Educators all across the country developing their own courses are using Radio Shack's AUTHOR I courseware development system—a screen-oriented authoring system that lets educators with no programming knowledge develop software for use in any subject or grade level.

Get the Courseware You Really Need. With AUTHOR I, teachers become actively involved in curriculum development. Courseware can be designed with specific needs and goals in mind.

No Obligation Seminar. Teachers, administrators and counselors can participate in a complimentary 8-hour seminar at your local Radio Shack Computer Center. AUTHOR I is simple to use, with full-screen editing, graphics, branching and many options. Call your local Radio Shack Computer Center or contact your Regional Education Coordinator for more details.

We'll Show You How. We've already demonstrated the effectiveness of AUTHOR I to Dr. Charles S. Cline and Louise Fulgham of Duval County Schools, Jacksonville, Florida; to Deborah Sinkis and Sam McClure of Worcester Public Schools, Worcester, Massachusetts; to Mary-Jane Frazier of Grand Prairie Independent School District, Grand Prairie, Texas; and to Nancy Tucker of Caddo Parish School System, Louisiana. Let us show you, too.

For the name of the full-time Regional Educational Coordinator in your area, call 800-433-5682 toll-free. In Texas, call 800-772-8538.

Radio Shack®
The name in classroom computing™
A DIVISION OF TANDY CORPORATION

For more information about Radio Shack educational products and services, mail to:

Radio Shack, 1400 One Tandy Center, Fort Worth, TX 76102

NAME _____

SCHOOL _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE _____

CIRCLE 191 ON READER SERVICE CARD

An Apple work alike at an attractive price.

HAVAC from Microsci

HARDWARE EVALUATION

Owen Linzmayer

Let's start right off by setting things straight. Havoc is a synonym for destruction. HAVAC is an acronym for Home/Academic Very Affordable Computer. This, my friends, is a review of the 64K Apple-compatible Havac computer from Mircosci. Now that we have dealt with the formalities, on with the review.

History

The Havac is a new computer with an interesting background. Back in the days of yesteryear, when software publishers were thriving on entertainment program sales, a small hardware firm decided that there was a market for a game machine that would run only Apple entertainment packages.

Since it would only play games, all that was needed was a joystick port and a disk drive to load the programs, reasoned the hardware developers. Unfortunately, more and more new games were being introduced that required keyboard input to work correctly. By the time the need for the keyboard became evident, it dawned upon the designer that he essentially had

HARDWARE PROFILE

Product: Havac
Type: Desktop
CPU: 6502
RAM: 64K/64K
ROM: 8K
Type of Keyboard: 63-key detachable full-stroke
Text Resolution: 40 x 24
Graphics Resolution: 280 x 192
Number of Colors: 16
Sound Capability: Yes
Ports: Parallel, serial, disk drive, hand controller
Dimensions: 5.5" x 10.75" x 14.5"
Documentation: Fair
Summary: An alternative Apple worth investigating.

Microsci Engineering Manager Alan Silver, the proud designer of the Havac.

Manufacturer:
Microsci Corp.
2158 S. Hathaway St.
Santa Ana, CA 92705
(714) 241-5600

an Apple-compatible computer. Why not expand the machine a bit and sell it as a full-blown computer system. That, dear readers, is the story of the Mircosci Havac.

Reality

The Havac of today is an unexpandable Apple-compatible computer based on the 6502 microprocessor. The main unit sports somewhat cumbersome 10.75" x 14.5" x 5.5" dimensions which encase a single-sided, single-density disk drive along with the computer motherboard. The heavily populated motherboard contains the 64K of RAM and 8K of ROM, as well as joystick, serial, and parallel interfaces. The detachable keyboard is a full-stroke 63-key model with the same layout as an Apple IIe. At $799 retail, the Havac lives up to its billing as a "very affordable computer."

The detachable keyboard of the Havac has 63 full-stroke keys arranged in the same fashion as those on the Apple IIe keyboard. The cable to the main unit is hardwired to the keyboard and has a male 15-pin D-type connector on the other end that plugs into the lefthand side of the Havac. The keyboard unit itself is made of plastic and does not feel very solid.

However, I was pleasantly surprised to find that the response from the keys is excellent. I also like the fact that the caps lock key has a small red LED that lights up to signal when the key is active. In the upper lefthand corner of the keyboard is a Microsci emblem that acts as the power indicator for the computer. My only complaint about the keyboard is that the Tab, Delete, Shift, and Return keys are too small.

Built into the front of the Havac is the

The layout of the Havac keyboard is identical to that of the Apple IIe with the exception of a small LED on the Caps Lock Key.

The design philosophy of the Havac is similar to that of the new Apple IIc (see review elsewhere in this issue). Both computers are compatible with the Apple II line of software, neither has expansion slots, and both provide the user with printer and communications ports built-in at no extra cost. The Havac is intended to "meet the needs of the first-time computer user."

While the design philosophy may be the same for both computers, the physical designs are much different. Whereas the IIc is a sleek, low-profile computer, the Havac is a box-like system that resembles an old fashioned breadbox. Although the Havac will never be exhibited in the Museum of Modern Art, the substantial price difference between it and the IIc makes it an attractive alternative.

disk drive. The unit is a typical Apple-compatible single-sided, single-density drive that is accessed as if it were in slot six of an Apple. The $199 optional external second drive is referenced as drive two, slot six. The disk drive closes with a small black lever. When a disk is inserted into the drive, the lever must be turned clockwise to 12 o'clock to engage the drive properly.

A disk containing the Havac disk operating system (DOS) is supplied with the computer. I like the format and features of this DOS, but it is not as useful as Apple's new ProDOS. A Havac DOS disk can hold a maximum of 104 files and display eight at a time in the main menu. Each of the eight files currently displayed by DOS is given a number. At the bottom of the screen are nine DOS commands, each with its own number. By typing a command number followed by a file number, you can perform operations with a minimum of keyboard input. This is excellent for beginning computer users, the main audience for the Havac.

Compatibility

For any Apple-compatible machine, the most important consideration is just how compatible it really is. After testing quite a few commercial software packages, I estimate that the Havac is about 80% compatible with available Apple II software. The Havac will not run software packages written specifically for the *IIe*, those that use CP/M, nor programs that need ProDOS and Applesoft Basic at the same time.

There are several different boot procedures that must be tried before you can determine whether or not a package will work on the Havac. These take into consideration different memory and language requirements, as well as if the program

The Havac runs most (but not all) of the software for the Apple.

can utilize lowercase. If the program needs Basic, you must own a copy of Apple DOS with Applesoft and Integer Basic. The Havac material suggests buying this disk from your local Apple dealer to clear up most compatibility problems that you may encounter.

Interfaces

The Havac has several ports for interfacing a variety of peripherals. On the back of the main unit are the printer, communications, video, and second drive connectors. On the far left of the rear of the computer is the parallel printer interface. The printer port is a male 15-pin D-type connector. To interface a parallel printer, you must have the appropriate 15-pin to Centronics cable available from Microsci for $40. You can also hook up a serial printer, but this is not as desirable since DIP switches on the bottom of the computer must be changed, and a special interface cable must be acquired.

To the right of the printer port is an RCA phono jack for video output to any standard NTSC composite monitor. If you want to use your television set as a display, you must get an optional RF modulator that plugs into the RCA phono jack.

Adjacent to the video output jack is the serial port. This female DB-25 connector is designed to be compatible with

the RS-232C standard serial interface. Since almost all telecommunications is done in serial, this is where you connect a modem. Of course, many other serial devices are available for the Apple II line of computers, but few use the standard DB-25 connector. If you wish to try to interface these third-party devices, you will have to build your own custom cables.

All the way over on the righthand side of the rear of the Havac is a female DB-25 connector for the second disk drive. *Creative Computing* was supplied with an external disk drive for this review, yet the cable coming out of the drive was too short for the unit to be placed to the right of the computer, the recommended position. I expect that this minor problem will be corrected by the time the Havac goes into full production.

Toward the front of the computer on the righthand side is a 9-pin D-type game socket. This connector is identical to those on the IIe and IIc computers. Any device that plugs into the hand controller socket of the IIe should work with the Havac, but since the IIe controller port leads to special mouse firmware, it is doubtful that all IIe peripherals can be used with the Havac.

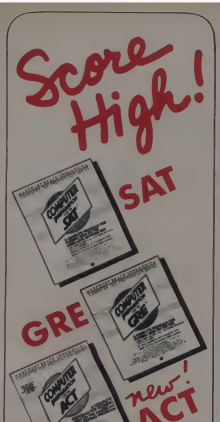
Support

The software and documentation included with the Havac are woefully inadequate. The word processor and communications package provided on the Havac DOS disk are bare bones programs with very few features. They serve well to introduce the first-time user to these applications, but must be replaced with more powerful packages if you ever wish to do any real work in those areas.

The same holds true for the documentation. The Havac manual is an introduction to the computer, not an in-depth look at how it works. For those interested in the advanced aspects of the Havac, a technical reference manual is available.

Ads for the Havac tout it as "the very personal computer." As far as ease of set-up and interfacing go, the Havac lives up to this claim. Even more important is the price. Several thousand dollars does not a personal computer make, regardless of what IBM might try to tell you. The basic Havac, priced at $799 complete, is a very good buy if you are in the market for an Apple compatible computer.

Like the IIc, Havac lacks expansion slots for exciting peripherals such as digitizers, sound boards, and voice generators. The IIc has the advantage of carrying the Apple logo, which almost guarantees that third-party manufacturers will design dozens of IIc-specific devices. Hopefully adaptors and interfaces will be available so that Havac owners can use the new IIc devices. ■



The HBJ Computer Test Preparation Series

This *proven* study method has helped thousands of students score higher on the SAT, GRE and ACT.

Each package contains double sided diskettes, a comprehensive review textbook and a 50-page User's Manual.

COMPUTER PREPARATION for the SAT* $79.95
Available for Apple, Atari, Commodore, IBM-PC, IBM-PCjr and TRS-80

COMPUTER PREPARATION for the GRE* $89.95
Available for Apple

COMPUTER PREPARATION for the ACT *new!* $89.95
Available for Apple

Order Now!

Ask for these HBJ programs at your local computer store or bookstore or call

800-543-1918

for major credit card orders. In CA call collect 619-699-6335.

HARCOURT BRACE JOVANOVICH

HBJ 1250 Sixth Avenue San Diego, CA 92101

CIRCLE 140 ON READER SERVICE CARD

Discover Magic Office System at your local dealer:

Joe Clark • Computer Supermarket
[illegible]

Dale Lack • Computer Headquarters
[illegible]

Randy Sharp • Gulf Coast Computer Shoppe
[illegible]

Howard Stovall • Lexington Computer Store
[illegible]

Charles Warner • The Softwarehouse
[illegible]

Bruce A. Billingsley • Cinarco-Elliott
[illegible]

Bob Hudson • The Computer Patch Inc.
[illegible]

Cinarco-Elliott
[illegible]

Ryan Hodge • Pawnee Computer
[illegible]

Steve Gates • Computer SOS
[illegible]

Gene Holley • The Computer Store
[illegible]

Vasant L. Abhyanker • Computers Plus Co
[illegible]

Roger Mass • Software Supermarket
[illegible]

Ken Welk • Apple Country Ltd.
[illegible]

Greg Chamberlain • SGC Computer Goods
[illegible]

Santa Rosa Computer Center
[illegible]

Stan Belzak • Juneau Electronics
[illegible]

artsci

CIRCLE 404 ON READER SERVICE CARD

Here's the only integrated Apple program with all functions plus spelling checker on one disk: Magic Office System.™

At last! The four most useful business programs in one integrated package for your Apple IIe and IIc.

Word Processing. Spreadsheet. Business Graphics. And an on-line Spelling Checker. All in Magic Office System.

One disk. No shuffle.

Now you can do presentations for your boss, your clients, your banker or investors—complete with spreadsheets and explanatory graphics and every word spelled correctly.

Or you can just do a simple letter—with every word spelled correctly.

You automatically raise the quality of your communications with a significant reduction of hassle.

WORD PROCESSING: an enhanced version of a very popular program with automatic formatting and printing.

SPREADSHEET: more powerful than VisiCalc® and includes variable width columns and output formatting.

BUSINESS GRAPHICS: easy to create pie charts and multiple bar charts.

SPELLING CHECKER: first ever on-line automatic checker with room for any other words you wish to add.

And Magic Office System's beautifully clear, simple icon menu organizes into visual file drawers with folders, documents and stationery for new material. You can move, edit, cut and paste with incredible ease. See the screens at left.

Want a Magic Office System right now? Check with your local dealer. If he doesn't have it, send in the citizen below.

It'll need 64k, an 80-column display, two disk drives and a new outlook on using your computer: takin' it easy!

artsci™

I can't find Magic Office System at my local dealer.

Please send me more information right now.

Name _____

Address _____

Phone _____

City/State/Zip _____

Company _____

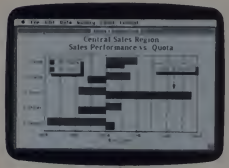
Mail to: ARTSCI 9545 Sunset Drive Suite 1 Hollywood, CA 91746

Or call 818/985-8121

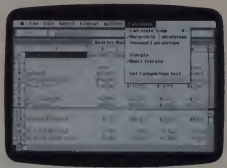
Ltr 1

CIRCLE 104 ON READER SERVICE CARD

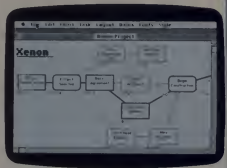
We interrupt this magazine fo



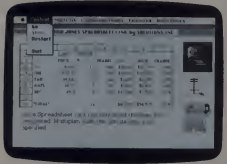
Macrosoft Chart.
business graphics.



Macrosoft Multiplan.
electronic spreadsheet.

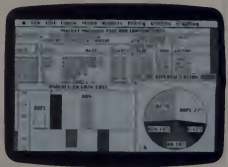


MacProject.
project management.

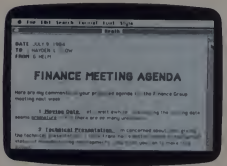


Dow Jones Spreadsheet Link.
stock analysis and communications.

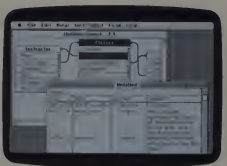
FileVision.
database management.



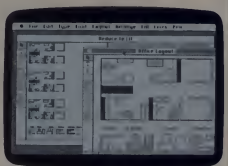
Dow Jones Market Manager.
stock analysis.



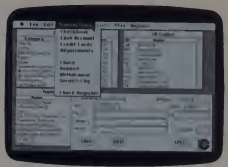
MacWrite.
word processing.



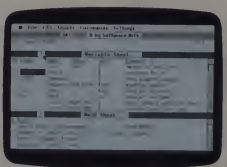
theBase.
database management.



MacDraw.
graphic illustration.



Home Mac Accountant.
personal finance.

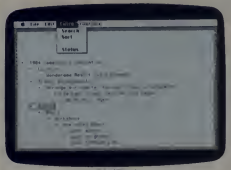


TK! Solver.
equation processor.

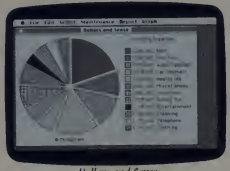
Helvadex.
database and communications.

*The programs above are just a few examples of new software for Macintosh. Some are available now, others will be released in the coming weeks. *Available 4th quarter 1984. **Available 1st quarter 1985.*
© 1984 Apple Computer Inc. Apple, the Apple logo, MacDraw, MacProject, MacTerminal, and MacWrite are trademarks of Apple Computer Inc. Macintosh is a trademark licensed to Apple Computer Inc.
For an authorized Apple dealer nearest you call **(800) 538-9696.** *In Canada, call* **(800) 268-7796** *or* **(800) 268-7637.**

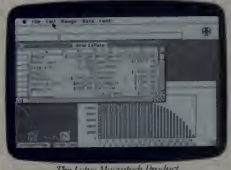
r some important programs.



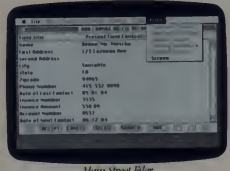
ThinkTank.
idea processor.



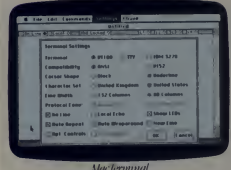
Dollars and Sense.
personal finance.



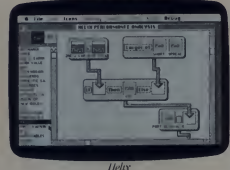
The Lotus Macintosh Product.
integrated business software.®



Main Street Filer.
database management.



MacTerminal.
data communications.



Helix.
relational database.

PFS: File.
database management.

Peachtree's Back to Basics.
accounting package.

Every business day, a new software program is being developed for the Macintosh™ Personal Computer.

Software for word processing. Spreadsheets. Business graphics. Project management. Database management. And data communications.

As well as software that enables Macintosh to do things that have never been done on a computer before.

Which means the world's easiest-to-use business computer is well on its way to becoming the world's most useful business computer.

Any authorized Apple dealer will gladly demonstrate that fact.

Just ask to see the computer that's software compatible.

With human beings.

Preschoolers Learn at Home

SOFTWARE EVALUATION

Penny Smith

"Pre-school education" has become a very fashionable concept now that having babies has again become a fashionable pastime. The market for pre-school learning packages is considerable, and the choices available to parents and educators are overwhelming.

We were spurred on in our desire to investigate the potential of some of these programs partly by those guilt-inducing TV commercials which appeared around Christmas and showed a loving father giving his darling pre-schooler "every educational and emotional advantage" and partly by the very real fact that we intend to educate our children at home for the next few years rather than send them to school.

Our reviews, therefore, are written from the viewpoint of parents who want to see their children enjoy what they are doing and remain interested in a program long enough to justify the sometimes substantial cost. We are also looking for the results of these programs in educational terms. In other words, what does the child really seem to learn, if anything? And does this learning correlate with the manufacturer's claims?

We do not use these programs as babysitters. One of our goals is to see how we, as parents, can interact with the computer and the child to enhance the learning process. At times this has not been easy, but at others the process has been exciting and fun as we have watched our children and their friends make new discoveries and grow in their understanding of the world around them.

One of our goals is to see how we, as parents, can interact with the computer and the child to enhance the learning process.

(Note: the father and child in the above-mentioned TV commercial campaign must just have booted up their program, because the father is not yet slapping the child's hand in frustration and demanding that he "do it the right way!" This is an almost overwhelming temptation and one that if succumbed to really ruins those warm feelings of giving the child every educational and emotional advantage.)

The following are learning packages that focus on early language and reading skills, specifically letter identification and basic familiarity with the computer keyboard.

Kids On Keys

Kids on Keys is an educational program by Frieda Lekkerkerker designed to introduce children to the computer

Kids On Keys

Meet your kid's new teachers.

At first glance, they look like funny creatures right out of a computer game shoot 'em up. But underneath the funny surface, they represent one of the most serious approaches to home education you've ever heard of.

INTRODUCING SPROUT™ SOFTWARE. GAMES THAT TEACH.

These amazing teachers are called Tink and Tonk. They come from Sprout. Software for kids 4 to 8.

The beauty of Sprout is how we balance entertainment with a healthy dose of education.

While kids are having fun at home, they're reinforcing what they've learned at school. Things like the alphabet, spelling, vocabulary, counting, adding, and pattern recognition.

You'll also like how Sprout prevents boredom. Our games grow up, instead of wear out. As kids get older, the game gets harder—with many variations and many decisions to make.

Sprout didn't learn how to do all this overnight. You see, we've got a hundred years of experience to lean on. (Our parent company is SFN, the country's #1 textbook publisher for elementary and high schools.)

We've also got the experience of Mercer Mayer, who has written or illustrated 80 children's books. He dazzles kids with ideas and pictures that keep them coming back for more.

So let TINK!TONK!™ software teach your kids. And when they play at the computer, they won't be playing around. They'll be learning something.

Compatible with Atari® Commodore® Apple® and IBM®

sprout

Games that grow up. Instead of wear out.

TINK!TONK! characters © 1983 TINK TONK, Inc. All rights reserved. TINK!TONK! is a trademark of TINK TONK, Inc. Sprout is published by Mindscape, Inc. Northbrook, IL 60062

CIRCLE 173 ON READER SERVICE CARD

keyboard while they learn to identify letters, numbers, and words. It is challenging and stimulating enough to engage the interest of pre-schoolers and adults. Our test players included, among others, a three-year-old and a recent college graduate.

There are three games from which to choose and four levels for each game. There is also an option which allows you to create your own pictures and words for Games 2 and 3.

In Game 1 letters and numbers float from the top of the screen to the bottom at varying rates of speed depending upon the level chosen. The player must type the letter or number before it disappears. After 15 letters and numbers, a balloon carrying a child and displaying a word appears. The player must type the word correctly, and the balloon goes up and bonus points are scored. In Levels 1 and 2 three-letter words are used on the balloon. Those in Levels 3 and 4 are slightly longer.

Ms. Lekkerkerker's preschool subjects must have taken touch typing at the Better Baby College.

Game 2 features a group of pictures, which float down the screen and disappear one at a time. The player must type the first letter of the word that identifies the object descending the screen in Level 1. In Levels 2, 3, and 4, the player must type the entire word before the picture disappears. A bonus round in which a partial picture of each object floats its way down allows the player to add extra points to his score.

The third game shows pictures that are numbered from 1 to 5. A word appears on the screen, and the player has to type the number that corresponds to the picture of that word before the word disappears at the bottom of the screen. Three tries are allowed to type the correct answer. The points awarded decrease with each try. Again a bonus round allows the player to gain additional points by identifying by number a partially revealed picture.

The option which allows the player to create his own words and pictures for the second and third games requires a blank disk and a joystick for drawing the pictures. This aspect of the program is really a great deal of fun and expands the life of the program enormously as far as maintaining the child's interest and encouraging creative exploration of the keyboard. These characteristics prolong the life of the program and protect the parent's investment. In our book this is a definite plus. We rate it significant learning tool and an excellent value for the money.

Having said that, we do have a couple of bones to pick with Ms. Lekkerkerker. These center around the concepts being taught and the level of dexterity needed to play the games which teach them. The program is said to be suitable for children ages 3 to 9. We tested it with a reasonably bright three-year-old who became frustrated and anxious at not being able to catch more than two or three of the letters which were showered down at the easiest level of the easiest game. Ms. Lekkerkerker's preschool subjects must have taken touch typing at the Better Baby College because none of the preschoolers we tested (who were, indeed, at the keyboard exploration stage) had a snowball's chance in hell of getting a particularly satisfactory or reinforcing response from the computer. We were able to circumvent this difficulty by having the child call out the letter/number or word to an adult who then typed it on the keyboard. This arrangement worked quite well in the letter/number/word identification category, but was not terribly effective in familiarizing the child with the keyboard, which is one of the avowed objectives of the program.

Another problem we had with Games 2 and 3 was that the lo-res pictures of objects were sometimes difficult to identify in the time it took for the object to descend the screen. Something that might be a coat or a shirt or a jacket or a blouse floats down a bit too quickly to give you a chance to explore all of the alternatives. Kids learn quickly, though, and this does prolong the life of the program. They'll get it next time through!

The partial pictures of the bonus rounds compound this problem. A little shape which might be the toe of a boot or the sleeve of a coat or part of a flower pot floats down the screen. The first few times it is quite frustrating, but even an adult can do it after a while.

SOFTWARE PROFILE

Name: Kids on Keys
Type: Educational game
Suggested Age: 3 to 9
System: 48K Apple, Atari, Commodore 64, IBM PC
Format: Disk
Summary: Identify letters, numbers and words.
Price: $34.95
Manufacturer:
Spinnaker Software
215 First St.
Cambridge, MA 02142
(617) 494-1200

Summary

Kids on Keys is an entertaining and imaginative program. It can be interesting even for a parent who will find it necessary to assist a pre-schooler in playing the various games. The Make Pictures option will keep an older child involved for hours experimenting with this aspect of the programming function. With assistance, pre-schoolers can learn letter/number and word identification, and older children can become proficient in keyboard manipulation.

The children seemed to be incorporating the words they learned playing the games into their vocabularies.

The primary hang-up appears to be that these two learning steps cannot take place at the same time. A child who is young enough to need to learn letter identification does not normally have the dexterity or familiarity with the keyboard to use the program unaided. One who is able to identify the letter and find it on the keyboard before it sinks into oblivion is usually past the age when letter identification is a significant hurdle.

In short, it is a good package but it requires flexibility and creativity in the adult who is supervising its use and could use some further documentation to help out in this process.

CIRCLE 405 ON READER SERVICE CARD

Word Pieces

Roger Shank has produced a fill-in-the-blank-type program designed to teach young children to distinguish between letters of the alphabet, to build the child's vocabulary, and to familiarize the child with the letters of the alphabet. This package turned out to be an immediate favorite with our young testers.

The program consists of three sets of two-letter word endings, which are displayed on the screen following the credits. The child selects -AR, -OG, or -IN. The appropriate pair of letters appears on the screen, and the child then attempts to make a complete word by

PITSTOP II. BECAUSE AUTO RACING IS NOT A SOLO SPORT.

When we introduced Pitstop, we created action in the pits. Now, with PITSTOP II, EPYX introduces true competitive auto racing, both on the track and in the pits. Auto racing is not a one man sport. With PITSTOP II, you can now experience the thrill of speed and competition as you battle your opponent in a race against the clock. Now, more than ever, the strategy of when you make a pit stop and your pit crew's speed and performance, combined with your skill on the track, will determine the winner.

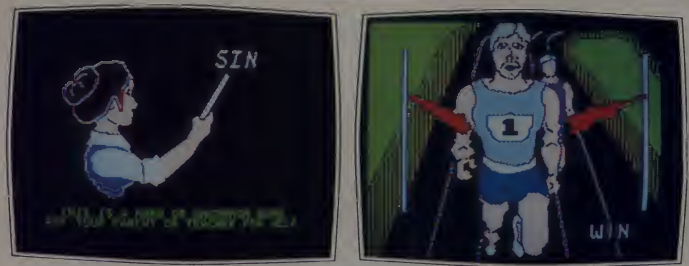
A split screen shows you your position and that of your opponent, a digital clock displays time and a lap counter gives you your race position as you race against each other in pursuit of the checkered flag. You can also play against the computer and take a practice lap or race against the computer controlled pace car as you prepare for real head-to-head competition. Step up to PITSTOP II because auto racing is not a solo sport.

One or two players; joystick controlled.

EPYX
COMPUTER SOFTWARE

Strategy Games for the Action-Game Player

CIRCLE 141 ON READER SERVICE CARD



Word Pieces

choosing a letter of the alphabet to go with that word ending. When the child presses a letter key, that letter appears on the screen and moves toward the word ending. If the letter and ending make a complete word, for example, DOG, LOG, or FOG, several things happen to show a successful combination has been made: The word flashes, musical sounds play, and an animated hi-res illustration of the word appears on the screen.

If the child chooses an initial letter that does not combine with the ending to make a complete word, for example, XOG or QOG, a blotch appears and the computer beeps.

This is an easy program for young children to use, and our young testers enjoyed it enormously. The pictures are humorous if a bit ambiguous in their illustration of certain words. How, for example, would you illustrate the word "kin" or "tin?" For certain other words such as GAR, PAR, and SIN, a picture of a school teacher pointing to a blackboard appears with a note to ask a parent or teacher about these more abstract or uncommon words.

It is definitely more rewarding to call forth one of the illustrations rather than rely solely on random selection of letters, and we found that the children did take note of the spellings of their favorite words and were able to produce them independently as well as with the help of the computer. They also seemed to be incorporating the words they learned playing the games into their vocabularies. Therefore, it would appear that this program does, in fact, deliver the type of learning experience it advertises.

Although we tested *Word Pieces* in a home situation, we feel it would be very appropriate in a classroom as well.

There is much to be learned from the concepts presented in this program. The only real misgiving we have about the program is the rather limited scope of the letter combinations allowed. Once a child has gone through the three word families, a feat which can be accomplished in a matter of minutes, he can easily lose interest. However, with a certain amount of creativity on the part of the adult in making up games and new ways to use the information learned, we found that this program actually had a reasonably long life and represented a good value for the money.

Summary

Word Pieces gets good marks for teaching what it says it's going to teach, good graphics, and a great amount of raw material with which to work in creating games and exercises to reinforce the concepts presented.

The people at Compu-Teach would do well to include some suggestions for alternate approaches to the use of the program in the documentation and expanded the number of word-ending games available in the package.

CIRCLE 406 ON READER SERVICE CARD

SOFTWARE PROFILE

Name: Word Pieces
Type: Educational game
Suggested Age: 3 to 7
System: 48K Apple, IBM PC
Format: Disk
Summary: Players creates words which are illustrated on screen.
Price: $29.95
Manufacturer:
Compu-Tech Inc.
240 Bradley St.
New Haven, CT 06511
(213) 777-7738

Letters and Words

Learning Well's *Letters and Words* is much more interesting than its slightly utilitarian-looking packaging and documentation might lead you to think. The package contains three games of varying difficulty to appeal to children from preschooler age to "up." We tested the program only on pre-schoolers and found that a five-year-old could do all but the most difficult level with relative ease. Our appraisal leads us to be a little more specific and put an age range of 3 to 6 on this particular game package.

There is a fairly long wait between loading the program and the appearance of the first screen. The designers have thoughtfully made it possible to bypass the introductory musical sequence. This is a minor point, but helpful if your child changes his mind a lot about which game he wants to play.

Letters and Words is designed to provide practice and reinforcement in three early reading skills. Game 1 teaches the concept of alphabetical order. Game 2 focuses on matching upper-and lowercase letters. Game 3 reinforces sight vocabulary and word picture matching skills.

In each game four boxes appear at the bottom of the screen. The player registers his responses by pressing the spacebar when the appropriate box is highlighted. The first box shows a little "yes man" who nods his head up and down. The second box shows the same little man shaking his head "no". The third box shows a question mark which indicates that the player has doubts about the answer and would like some help.

Pressing the bar when the question

IMPOSSIBLE MISSION.
YOUR MISSION–TO SAVE THE WORLD.

As a member of the exclusive Anti-Computer Terrorist Squad (ACT), your mission is to find and reach the infamous Elvin, who is holding the world's population hostage under threat of nuclear annihilation. You must negotiate a path through the rooms and tunnels of his headquarters trying to avoid Elvin's robot protectors.

Should you try to outrun or jump over the next robot or play it safe and take the time to assemble the codes needed to deactivate the robots and then to find and stop Elvin.

Use your camera to photograph as many clues as possible to find the password which will allow you to penetrate Elvin's control room.

Your Mission—To Save The World, But Hurry!

One player; joystick controlled.

EPYX
COMPUTER SOFTWARE

Strategy Games for the Action-Game Player

CIRCLE 138 ON READER SERVICE CARD

Letters and Words

box is highlighted produces a short instructional sequence after which the game continues. The final box shows a hand waving goodbye. This box returns you to the main menu. It took our testers a little while to get their decision-making processes coordinated with the automatic progression the box highlighter. There is a "utility" option which allows you to decrease the amount of time each box is highlighted. Decreasing the amount of time between highlighted changes, oddly enough, seemed to help the younger children work with this response method. It is nice to have this option available.

Game 1 features alphabetization or the concept that letters come in some sort of order. Four letters drop down from the revolving "letter machine," leaving a space between the second and third letters. The space is filled by a boxed letter, and the player must decide if the letter in the box is in correct alphabetical order.

For example, the letters DE-GH may drop down. The space between E and G might then be filled with an L. If the player makes the correct response (i.e. that the L is not in correct alphabetical order) the letter is X'ed out, a little tune plays, and the player receives a "present" (more about this later).

This is not a difficult game, but it does offer valuable practice in a concept that adults take for granted but of which children sometimes are not aware. During the game, the alphabet marches by on the top of the screen to give additional help.

Game 2 features a "letter splitting machine," which spits out an upper-and a lowercase letter. The player decides if they are correctly matched. Again, if the player gives the right response, he adds another present to his collection.

In the third game an object appears on the screen. Lowercase letters then pop out to form a word. The player must decide if the word describes the picture. A present is the reward for a correct response. This game has three different sets of words which increase in length and difficulty and can be loaded in the Utilities mode. It is this option that makes the package valuable for children above pre-school age.

Most four-year-olds would prefer a kite, a puppy, a car, and a ring to 4000 points any day.

SOFTWARE PROFILE

Name: Letters and Words
Type: Educational game
Suggested Age: Pre-K and up
System: 48K Apple, IBM PC, PCjr.
Format: Disk
Summary: Animated graphics reinforce letter identification, alphabetization and early reading skills.
Price: $49.95
Manufacturer:
Learning Well
200 South Service Rd.
Roslyn Heights, NY 11577
(516) 621-1540
Methods & Solutions, Inc.,
Woburn, MA 01801

The presents are little gift-wrapped surprise packages which accumulate with each right answer during a game round. Up to ten presents can be acquired each round, and they are stored in the upper lefthand corner of the screen to be opened at the end of the round by a special machine. This is a clever approach to score-keeping. Most four-year-olds would prefer a kite, a puppy, a car, and a ring to 4000 points any day: even if the prizes do vanish when the next round starts. We found one of our testers striving to get at least five points each time since present number 5 in Game 2 is a puppy . . . wishful thinking.

The Utilities section offers three functions in addition to changing the timing of the answer box highlight and loading new word lists as mentioned above. A Performance Summary allows you to review a player's performance on the last round of a game played. This is not so crucial at home, but might be very helpful in a classroom situation. It records the number of questions answered and the exact letters and/or words which were missed in that round. This record is cleared when another round is played or when you press S in the Utilities mode to set all scores at zero.

The Utilities also allow you to control the number of questions presented in each round you play. You can choose up to 10 questions per round.

The documentation ends with four suggested activities to reinforce the concepts and skills in the package. Activities of this sort—yarn writing, alphabet hopscotch, etc.—are pretty standard fare in most nursey schools and kindergartens, but presenting them with the computer learning games is a nice touch and is helpful in encouraging parent/teacher creativity. It also acts as a reminder that the skills presented are not designed

SUMMER GAMES.
NOW IT'S YOUR CHANCE TO GO FOR THE GOLD.

You're an Olympic athlete competing in eight key events at the Summer Games. How well can you score in track, swimming, diving, shooting, gymnastics and more? So realistic, there's even an opening ceremony and awards presentation after each event.

Unlike other "Olympics-Like" games, Summer Games has incredible realism, superb state-of-the-art graphics and sound effects (including national anthems from 18 countries), and it is a true action-strategy game. In each event you must plan and execute your game strategy in order to maximize your score. It is not just a matter of how fast you can move the joystick.

So change into your running shoes, grab your joystick and **GO FOR THE GOLD!**

One or more players; joystick controlled.

EPYX
COMPUTER SOFTWARE

Strategy Games for the Action-Game Player

CIRCLE 139 ON READER SERVICE CARD

A B sCenes

primarily to roll up high scores on a computer screen but must be reinforced and applied to real-life situations.

Summary

Letters and Words is an easy program for a child to use and entertaining enough to hold his interest for quite a long time. The documentation is good and includes several helpful suggestions for followup on the skills and concepts presented.

The ingenious scoring and response systems are excellent examples of programming geared to the non-reader. And, finally, it does, indeed, appear to give some value practice in alphabetization and letter recognition skills. Good job, Learning Well.

CIRCLE 407 ON READER SERVICE CARD

A B sCenes, Level 1

A B sCenes operates on the premise that even on the complicated maze of the computer keyboard a young child can remember the location of a key that calls forth a pleasing graphic illustration; and in using that key over and over he will learn to distinguish between letters and discover the symbolic relationships among letters, words, and objects. Amazingly enough, this premise seems to be valid. Even a very young three-year-old who tested the first game for us was successful and was able to produce certain animated pictures at will after a little practice.

The package consists of three games which are represented on the menu screen by an E followed by an egg for Game 1; an egg followed by an E for Game 2; and an egg followed by the word EGG for Game 3.

Game 1 is very simple and designed to encourage familiarity with the computer keyboard as well as discrimination between letters. The child can produce an animated picture of an object by pressing any key on the keyboard. E, obviously, produces an egg which cracks open to reveal a little chick. Q calls forth a picture resembling Elizabeth II and a rendition of "God Save the Queen."

A B sCenes is a very appealing game which was enjoyed by every child who tested it.

G is a gate that opens as a sun rises and the "Hallelujah Chorus" plays in the background. ((It would be wise for the parent or teacher to be available to explain that G stands for gate and not sun. This sort of logical mistake on the child's part would certainly be counter-productive as far as learning initial letter sounds. We also found it necessary to explain that X stands for X-ray and not skeleton.)

These two examples notwithstanding, the graphics are extremely clever and imaginative, and the children enjoyed playing this game long after we had become bored with it. At the next sitting they also seemed to remember which letters went with which pictures, so even the very young ones had begun the learning process which the instruction booklet lists as one of the objectives of the package.

Game 2 embellishes the process begun in the first game. This time a picture appears, and the player must type the first letter of the word in order to see the animation and hear the little tune. He must press the Y to get the yoyo to go up and down or the J to make the lid of the jar open and close. This game was beyond the very young players but gave a feeling control that four- and five-year-olds who were more familiar with beginning letter sounds enjoyed.

Game 3 is just like Game 2 except that the player must type the entire word rather than just the first letter. When the first letter is typed, the picture moves slightly, and a series of hyphens appears to indicate the number of letters in the word. When the full word is completed, the picture finishes its animation sequence, and a new object appears.

A B sCenes is a very appealing game which was enjoyed by every child who tested it. Since this was one of the first packages we tested, it has received quite a bit of use, and we have been able to observe that the children do seem to progress from one level to the next of their own accord after they have mastered the skills presented at each level. Our five-year-old goes directly to Game 3 to work on complete words rather

SOFTWARE PROFILE

Name: A B sCenes, Level 1
Type: Educational game
Suggested Age: 3 to 6
System: 48K Apple, IBM PC
Format: Disk
Summary: Letters and beginning reading skills are taught by animated graphics.
Price: $29.95
Manufacturer:
Compu-Teach Inc.
240 Bradley St.
New Haven, CT 06511
(203) 777-7738

than play on the less challenging levels. While the younger children will return to Game 1 for a time, they seem to be applying the letter sounds learned to the more intentional requirements of Game 2.

These are easy games for a child to play alone or with other children. Apart from the minor explanations noted above, little adult supervision is needed. This is a big plus because the children enjoyed the animated graphics long after the adult were ready to call it quits.

Jordan Mechner has done a terrific job with .the graphics and program design. He has produced a usable and enjoyable package. One observation we should make as far as the learning of letter sounds, however, is that in the spelling game (Game 3) many of the words end in a silent E. As the children play the game, they are building a sight word vocabulary, but they can also be confused by the vagaries of English spelling rules.

Summary

We consider *A B sCenes* an excellent investment. Although the games are simple and the number of possible graphic presentations necessarily limited to 26, the children with whom we tested it were all enthralled with it and appeared to be polishing their reading and spelling skills as well.

A B sCenes, Level II

A B sCenes Level II is basically identical to *Level I* except that the words used are significantly longer and more difficult than those in the first package. For example, the *Level I* word for K is key. The *Level II* word is kangaroo. In the first level, U is used as the initial letter in the word up. Umbrella is illustrated in Level II.

This difference is not particularly important in Games 1 and 2 since the only factor that comes into play in both programs is the initial letter sound. Up to this point, the child who enjoyed *A B sCenes, Level I* will have a similar, if slightly shorter-lived, love affair with *Level II*.

The problem arises in Game 3 in which the player is required to type the entire word correctly to animate the graphic illustration. In *Level I* it is not too great a step from learning that the initial letter in the word ant is an A to being able to reproduce the sight word "ant." However, it is quite a feat to go from learning the initial letter in kangaroo to being able to type out the entire word. Kangaroo is not a "sight word." It is one that takes a good deal of practice to sound out and spell.

SOFTWARE PROFILE

Name: A B sCenes, Level II
Type: Educational game
Suggested Age: 3 to 6
System: 48K Apple
Format: Disk
Summary: Letters and beginning reading skills taught by animated graphics.
Price: $29.95
Manufacturer:
Compu-Teach Inc.
240 Bradley St.
New Haven, CT 06511

Summary

Although we can give *A B sCenes Level I* an enthusiastic review, *Level II* seems to make too great a jump in skill level between games to achieve the same sort of sequential mastery and self-motivation that make *Level I* so valuable. ■

CIRCLE 408 ON READER SERVICE CARD

Best protection from sneaky typos that worm their way into your Apple documents!

THE SENSIBLE SPELLER™

won't let misspellings get away!

This unique software program, a virtual electronic dictionary, catches spelling mistakes in your writings. It actually displays misspelled words in context, suggests the correct spelling, and allows immediate replacement of misspelled words with correct ones. It derives its huge, 80,000-word vocabulary...which is all on disk...directly from the official Random House Dictionary.

Sensible Speller is friendly and fast, taking only a minute or two to correct a ten-page document. It provides room on disk to add thousands of your own words. It is compatible with nearly all Apple word processor programs* and runs on all Apple //c, //e, II+ and Apple-compatible computers. Yes, Sensible Speller is the "best of its kind," as stated by Softalk Magazine in its March, 1984 issue.

Sensible Speller is available for $125 in either the "IV"* or ProDOS version at your dealer or you may order it direct, enclosing $1.25 for shipping. Visa/MasterCard/Check/COD welcome! And...send for a free brochure on all Sensible Software products.

Sensible Software, Inc.® 24011 Seneca, Oak Park, MI 48237 (313) 399-8877

*It works with all the following word processors, with owners of trademarks indicated in parentheses: DOS 3.3 & DOS 3.1 AppleWorks (Apple Computer, Inc.), Bank Street Writer, Format II (Broderbund), HomeWord and Screen Writer (Sierra On-Line Inc.), Word Handler (Silicon Valley Systems), CP/M, Wordstar (Digital Research Corp.), Micropro International, PFS: WRITE (Software Publishing, Inc.) and others. All features are not available with CP/M, PFS: WRITE and Word Handler.

CIRCLE 183 ON READER SERVICE CARD

The Intersection of Sesame Street and Silicon Alley

CCW Educational Games for the Color Computer

SOFTWARE EVALUATION

Owen Linzmayer

All across America kids sit spellbound in front of their television sets watching educational PBS broadcasts. No, they are not watching Masterpiece Theater, but rather, the Children's Television Workshop's popular series, "Sesame Street." Instead of forcing educational material upon the kids, CTW actually makes it fun to learn. Colorful puppets like Oscar the Grouch, Big Bird, and the lovable couple Ernie and Bert capture the children's imaginations, become their lifelong friends, and in the process, teach the kids about arithmetic and the alphabet.

A close relative of CTW is the Children's Computer Workshop (CCW), which has licensed a series of educational programs for the TRS-80 Color Computer to Radio Shack. Modeled on the popular TV series, the CCW programs incorporate some Sesame Street favorites into the games. Big Bird is one of my all-time favorite characters, so let's start by examining *Big Bird's Special Delivery*.

Big Bird's Special Delivery

Like all CCW games, *Big Bird's Special Delivery* comes in a color-coded package that denotes the intended age group of the audience. *Special Delivery* is geared toward children between three and six years old. The instruction manual is yellow, and the cassette tape enclosed requires a 16K Color Computer with Extended Basic.

The object of *Big Bird's Special Delivery* is for the child to help Big Bird and Little Bird deliver packages to the correct stores. There are two different games included, and two levels of difficulty for each game.

The first, easier game is called The Same Game, in which Little Bird appears carrying a package on his head. The child must identify what it is Little Bird is carrying, and then locate the store which has the same object displayed in its window.

Using the left and right arrow keys, the child moves Little Bird beneath the correct store, and then presses the up arrow to fly the package to its intended recipient. If the child is correct, the store owner nods his head, and the package is delivered. If, however, the child's guess is wrong, the owner shakes his head No.

The child must identify what it is Little Bird is carrying, and then locate the store which has the same object displayed in its window.

The child continues matching the packages with the objects in the windows until all four stores have received their packages, at which point all of the display lights blink on and off and four new window objects appear.

Big Bird's Special Delivery

The Same Game is a good starting point to get the child comfortable with the idea of using the keyboard to manipulate objects on screen. Older children will be more challenged by Find the Right Kind, the more difficult game of the two. The premise is the same: the child must deliver packages, but instead of matching pictures, the child must determine what store sells objects similar to the one Little Bird is carrying.

Find the Right Kind is something like the "which of these doesn't belong" game played on Sesame Street. For instance, Big Bird gives Little Bird a banana to deliver. There are pictures of a flower, a dress, a piano, and an apple in the store windows. The child must make the connection that both bananas and apples are fruit and then deliver the banana to the store with the apple in its display.

Big Bird's Special Delivery was the favorite package among our playtesters. Pam, a cute four-year-old, loved this one, even though she had to be helped

ADD NEW DIMENSIONS TO YOUR COMMODORE 64

COMMODORE 64 SIGHT & SOUND is *the* "hands-on" sound and graphics tutorial for the Commodore 64! Beginner or expert, you'll find easy-to-follow, sophisticated techniques and listings to create graphics and bring sound and animation to your monitor or TV!

Full of ready-to-use ideas, you'll get information and applications *not found* in your user's manual, including:

- How to maximize color reception from your TV
- How to construct a monitor cable
- Advice on solving disk drive problems
- An introduction to Simon's BASIC
- Multi-voice sound potential
- Animation

All the information you'll need to make your Commodore 64 a full sound and graphics machine is found between the covers of COMMODORE 64 SIGHT & SOUND!

COMMODORE 64
SIGHT & SOUND
by John J. Anderson

ORDER YOUR COPY TODAY!

For faster service, PHONE TOLL FREE, 9 am-5 pm, EST:

1-800-631-8112

(In NJ only 201-540-0445)

Also available at your local bookstore and computer store.

CIRCLE 213 ON READER SERVICE CARD

CREATIVE COMPUTING PRESS

Dept. ME9F, 39 East Hanover Avenue, Morris Plains, NJ 07950

Please send me _____ copies of COMMODORE 64 SIGHT & SOUND at $12.95* plus $2.00 postage and handling ($5.00 outside USA) each. #58-5

Payment enclosed $_____. *Residents of CA, NJ and NY State add applicable sales tax.

Charge My: ☐ AmEx ☐ Visa ☐ MC

Card No._____ Exp. Date_____

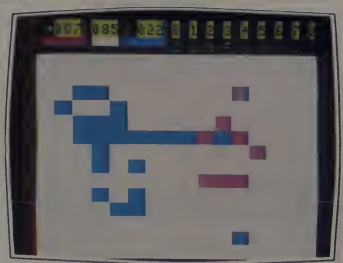
Mr./Mrs./Ms._____
print full name

Address_____

City/State/Zip_____

☐ Please send free catalog.

Grover's Number Rover



Flip Side

sometimes while playing Find the Right Kind.

At first I was a bit skeptical about the Sesame Street characters being used to sell software, thinking it was only a marketing trick, but it seems that the character tie-in really makes the children want to play again and again.

SOFTWARE PROFILE

Name: Big Bird's Special Delivery (RS#26-2525)
Type: Educational Game
System: Extended Basic TRS-80 Color Computer
Format: Cassette
Summary: Figure recognition and association
Price: $19.95
Manufacturer: Tandy-Radio Shack Fort Worth, TX 76102

Grover's Number Rover

Also designed for the same age group is *Grover's Number Rover*. Grover is blue and looks as though he could be Oscar the Grouch's well-groomed cousin. He pilots a large space ship adorned with ten windows. Strange creatures called Twiddles roam the planet surface beneath the UFO, and the children can move these Twiddles around, as well as suck them up into the space ship. There are several sections to *Grover's Number Rover*, all of which have internal instructions and two levels of play.

The easier levels are intended to familiarize the child with the controls used in play: the arrow keys and ENTER. Once the child has become accustomed to these, more difficult games can be played.

Twiddles Counting is the first game that has any real educational value. In it, the child counts the number of Twiddles on the screen and then presses the number key that tells how many he sees. After pressing the key, the number appears on the screen, and the child can change his answer before pressing the ENTER key. If the child is correct, a big tube beams the Twiddles up into Grover's Number Rover. Not only does this game reinforce the child's counting skills, it helps the child associate the number he speaks while counting with the written number he sees on the keyboard and screen.

Twiddle Away and Twiddle Adding present the child with simple subtraction and addition problems, respectively. These two sections are most advantageous if an adult sits nearby and helps the child when problems crop up.

SOFTWARE PROFILE

Name: Grover's Number Rover (RS#26-2522)
Type: Educational game
System: Extended Basic TRS-80 Color Computer
Format: Cassette
Summary: Fundamental mathematics
Price: $19.95
Manufacturer: Tandy-Radio Shack Fort Worth, TX 76102

It isn't long before even three- and four-year-olds can add and subtract single digit numbers using *Grover's Number Rover*. This gives the child a head start when it comes to learning more advanced concepts in school. While the sound effects and graphics of this package aren't very exciting, they suffice to keep the children interested. *Grover's Number Rover* is well done, and successfully teaches the fundamentals of addition and subtraction at the child's own pace.

Twiddle Away and Twiddle Adding present the child with simple subtraction and addition problems.

Flip Side

Flip Side is a CCW game aimed at children ten and older. In addition to Extended Basic, *Flip Side* requires two joysticks to play. The object of the game is for the child to fill the entire board with colored blocks. Whether or not a position is flipped to a certain color block depends upon the surround rules that appear in the upper righthand corner of the game screen. If, for example, an F is located below the number 4, then any position surrounded by four blocks will "F"lip to the other color. Other possibilities are "U"nflip and "N"o change. The players decide upon the surround rules that govern the play of the game.

One or two kids can play *Flip Side*, though there is no computer opponent if

only one child is playing. This is somewhat disappointing, as it is much more fun to compete. The cursors are moved around the board using the joysticks, and a position is claimed by pressing the red button. Once the ENTER key is pressed, the computer scans the board and flips and unflips pieces based upon the surround rules chosen earlier. Sometimes a child may think that he is close to victory, when all of a sudden, the entire board flips over to the opponent's color!

Sometimes a child may think that he is close to victory, when all of a sudden, the entire board flips over to the opponent's color!

Flip Side is intended for children ten and older. I think it is much better suited for even older kids, maybe even young adults. The concept is interesting, yet it is very difficult to plan a worthwhile strategy. Even Gail, Pam's precocious 12-year-old friend, had difficulty playing *Flip Side*. In fact, I gave the game a whirl and found it challenging, if not frustrating! Instead of making a simple game in which the goal is to have children "look ahead," plan their actions and predict the computer's reactions, CCW has turned *Flip Side* into a very difficult game that becomes frustrating before it becomes fun.

A word about all of the TRS-80 Color Computer CCW educational games: you shouldn't expect to hand any of these packages to your child and send him off to the computer alone. Plan to spend anywhere from 15 minutes to an hour teaching the child how to play the game, which keys to press, and simply encouraging him to try answers even though they are not sure it is correct. Your initial investment of time and attention will pay off, as the child will want to come back later and play the games alone—just for the *fun* of it. If you don't tell the kids that these CCW games are good for them, you won't ruin their fun.

The CCW games should have been released on ROM cartridges, not cassette tapes. As it stands now, someone familiar with the workins of the Color Computer must help the child type the correct commands to load the tape, and then stand by to insure that nothing goes wrong. A ROM pack would be the easiest, fastest, and most efficient way to load these programs. Thanks to the Atari VCS, almost every child in America knows how to insert a cartridge! Let's hope that in the future Radio Shack considers this change in medium. ■

CIRCLE 410 ON READER SERVICE CARD

SOFTWARE PROFILE

Name: Flip side (RS#26-2529)
Type: Educational game
System: Extended Basic TRS-80 Color Computer
Format: Cassette
Summary: Too advanced for young users
Price: $19.95
Manufacturer:
Tandy-Radio Shack
Fort Worth, TX 76102

Get Productive!
With these new how-to-do-it books

DATABASE AND FILE MANAGEMENT SYSTEMS FOR THE MICROCOMPUTER
Nelson T. Dinerstein
CREATING THE PERFECT DATABASE USING DB MASTER
TRISH McCLELLAND

Apple to IBM PC Conversion Guide
by Richard Steck. The first book to show Apple users how to convert Apple programs and peripherals to IBM PC use. 18047, $11.95

Database and File Management Systems for the Microcomputer
by Nelson T. Dinerstein. A timely, clear introduction to database management from the best-selling author of dBASE II for the Programmer. 18088, $15.95

Creating the Perfect Database Using DB MASTER
by Trish McClelland. Outlines a tested process you can use to create a database using DB MASTER on your Apple or IBM PC. 18039, $17.95

60 Business Applications Programs for the TRS-80 Model 100 Computer
by Terry Kepner & Mark Robinson. A valuable business tool—with programs for interest calculation, accounting, depreciation, and much more. 18052, $17.95

Commodore 64 Tutor for Home and School
by Julie Knott & Dave Prochnow. Helps you learn Logo, PILOT, and BASIC quickly and painlessly on your Commodore 64. 18074, $15.95

The ABCs of Lotus 1-2-3
by Bill Kling. This step-by-step tutorial for beginners helps you put 1-2-3 to work immediately in your business. 15996, $18.95

Local Area Networks
by James Harry Green. This complete user's guide helps you understand the technology, evaluate the alternatives, and select a local area network. 18065, $24.95

To order, contact your local bookstore or computer store, or contact

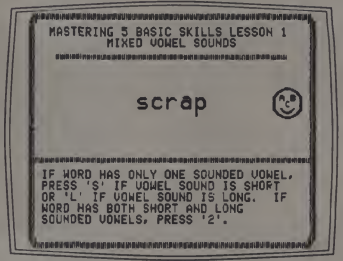
Scott, Foresman and Company
Professional Publishing Group,
Dept. CC-4
1900 East Lake Avenue
Glenview, IL 60025
312/729-3000, x2208

For Canadian orders, please contact
Gage Publishing Company
164 Commander Blvd.
Agincourt, Ontario M1S 3C7

CIRCLE 189 ON READER SERVICE CARD

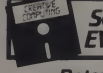
Growing Up Literate

Learning to Read and Write by Computer


MASTERING 5 BASIC SKILLS LESSON 1
MIXED VOWEL SOUNDS
scrap
IF WORD HAS ONLY ONE SOUNDED VOWEL, PRESS 'S' IF VOWEL SOUND IS SHORT OR 'L' IF VOWEL SOUND IS LONG. IF WORD HAS BOTH SHORT AND LONG SOUNDED VOWELS, PRESS '2'.

Reading

This month we deal with the first two of the three R's here, while Dave Ahl looks at the third elsewhere in the issue. We have a reading package for third to fifth graders and two grammar packages which should help older students with spoken as well as written English.



Betsy Staples

Reading

Reading, program number 1013 from Centurion Software, is subtitled Mastering 5 Basic Word Attack Skills. On the cover of the package, we read that "reading skill is dependent on the ability to apply the primary Word Attack rules of the English language until those rules can be applied automatically . . . " We were puzzled by the reference to word attack skills and, since our education credits are well over a decade old, decided to ask around to see if the designation was a newcomer to the lexicon of educational jargon. We asked several people we thought ought to know, and not one showed a glimmer of recognition, so we called Centurion and asked a woman who sounded as though she thought she knew. She defined word attack skills as those skills one uses to attack words. We thought of offering her a definition of tautology, but gave up with a simple sigh instead.

Be word attack skills what they may, *Reading* is an interesting package that focuses on the components of words. Vowel sounds, consonant blends, compound words, affixes, and syllable counting are drilled in a no-nonsense format that concentrates on letters rather than detailed graphics or catchy tunes (the closest thing to graphics the program offers is a small smiley face that flashes when you proffer the correct answer).

The only frills this program includes are in the menus, of which there are three. The first menu that appears on the screen is the operating menu, which asks for the student's name and the "printer code." If you read the lines at the bottom of the screen, you will learn that to enter either of these bits of information you must press the period key and then enter the name or code ("Contact Centurion for the correct code for your printer"). If you fail to notice the instructions, you will find yourself in the content menu before you can say "user-friendly."

The content menu allows you to choose one of the five subjects; a lesson number; a set of 10, 20, or 30 problems; and a specific series of problems, if desired. With the response menu, you can set the program for study or test mode depending on whether you want problems to be repeated until they are answered correctly or not. You can also decide whether or not to control the amount of time a student is given to answer. If you decide to limit the response time, you can specify a period of from 1 to 99 seconds. And you can specify whether or not you want a tone to indicate right and wrong answers. To make changes in the content and response menus, you must press the period, followed by the C to flip through the choices.

The drills themselves are simple, especially when compared with the configuration exercise set forth in the introductory menus. In Mixed Vowel Sounds, you look at a word displayed in hi-res characters and press one of three keys to indicate if it contains a long vowel, a short vowel, or one of each. In Mixed

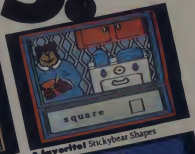
SOFTWARE PROFILE

Name: Reading
Type: Educational program
Suggested Age: Grades 3 to 5
System: Apple
Format: Disk
Summary: Down-to-earth drill and practice
Price: $39.95
Manufacturer:
Centurion Industries
1526 Main St.
Redwood City, CA 94063
(415) 364-9456

EXPERIENCE COUNTS.

Introducing NEW software from Weekly Reader – education experts for over 55 years!

"One of the best!" Stickybear Opposites



A favorite! Stickybear Shapes

A word-winner! Stickybear ABC

Best-seller! Stickybear Numbers

NEW!

Exploring Tables and Graphs

Level I (ages 7-10)
Level II (ages 10 and up)

Now the publishers of Weekly Reader have turned their best-selling classroom skills program into software for home use. Here's an opportunity for boys and girls to master vital skills so important in today's data-hungry world.

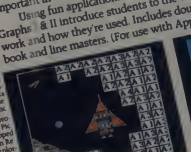
Using fun applications and games, Exploring Tables & Graphs™ I & II introduce students to the way tables and graphs work and how they're used. Includes double-sided disk, guide-book and line masters. (For use with Apple® computers)

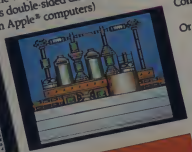
Stickybear™ Early Learning (ages 3-6)

Beginning learners catch on to important basics fast with delightful software created by Richard Hefter, author and illustrator of over 100 children's books!

Recognizing shapes, understanding opposites, counting skills, learning the alphabet... it's easy and lots of fun. Kids love the vibrant, rainbow colors and animation. Each program includes a hardcover 32-page book, poster and stickers. (For use with Apple and Atari computers. Available soon for Commodore 64 computers.)

Look for our software in finer computer stores everywhere. Or call toll-free 800-852-5000. Dept. AH-2





Pic. Builder™ (ages 8-16)

A unique software picture-building kit that let's imagination run wild while developing important computer skills. Kids can start with the 40 build-by-number pictures on the disk... then go on to create their own pictures! Endless possibilities. Includes 8 separate palettes of 48 building blocks each. (For use with Apple and Atari® computers. Available soon for Commodore 64 computers.)

CIRCLE 204 ON READER SERVICE CARD

Weekly Reader Family Software

A division of Xerox Education Publications
Middletown, CT 06457

Stickybear and Pic. Builder are registered trademarks of Optimum Resource, Inc.

Stickybear programs and Pic. Builder developed by Optimum Resource, Inc. Exploring Tables and Graphs I and II developed by TERC.

Apple® is a registered trademark of Apple Computer, Inc. Atari® and Commodore 64 are registered trademarks of Atari, Inc. and Commodore Electronics, Ltd., respectively.

A-M73AH2

A private tutor in every box.

Studying and preparing for school and college can be the absolute worst.

But with computer programs from CBS Software, students can be their absolute best.

Success With Math,™ *MicroSpeedRead*,™ and *Mastering The SAT*†—created, tested and endorsed by professional educators—are just like having a private tutor.

In fact, they're better. Because not only do they coach you, explain concepts to you and quiz you, they also do it very patiently. They never get angry. And they're on call 24 hours a day.

If you're headed for college, you'll agree CBS Software is your key to success.

Available for Apple® II+/IIe/IIc, Atari® Commodore 64,™ IBM® PC and PCjr

Enter our "KEYS TO COLLEGE" Sweepstakes.

You could win a full year's tuition to the college of your choice—up to $10,000!

There's nothing to buy. It's easy. It's fun. And it's our way of underscoring that CBS Software can be your key to success.

Look for details and entry forms wherever you buy CBS Software. Or write to us at the address below.

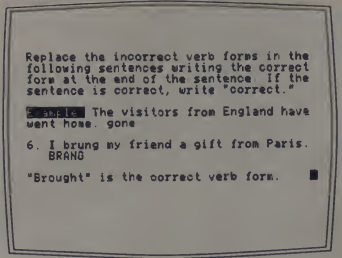
For these and more exciting programs, write for our catalog. CBS Software, One Fawcett Place, Greenwich, CT 06836

In Canada, contact Holt, Rinehart and Winston at (416) 255-4491. © 1984 CBS Inc. CBS Software, a label of CBS Inc. One Fawcett Place, Greenwich, CT 06836. (203) 622-2525. † "SAT" is a registered trademark of the College Entrance Examination Board. This program was prepared by CBS Software and its developers which bear sole responsibility for its contents. Apple®, Atari® and IBM® are registered trademarks of Apple Computer, Inc., Atari, Inc. and International Business Machines Corp., respectively. ™Commodore 64® is a trademark of Commodore Electronics Ltd.

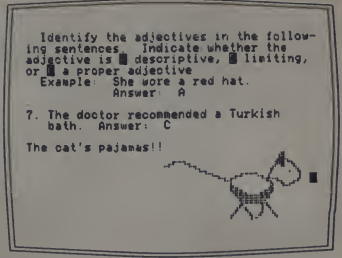
CBS SOFTWARE

Making you the best.

CIRCLE 112 ON READER SERVICE CARD


Replace the incorrect verb forms in the following sentences writing the correct form at the end of the sentence. If the sentence is correct, write "correct."
5. She is The visitors from England have went home. gone
6. I brung my friend a gift from Paris. BRANG
"Brought" is the correct verb form.

Principal Parts of Verbs


Identify the adjectives in the following sentences. Indicate whether the adjective is D descriptive, L limiting, or P a proper adjective
Example: She wore a red hat.
Answer: D
7. The doctor recommended a Turkish bath. Answer: C
The cat's pajamas!!

Adjectives

Position blends, you specify whether a consonant blend is at the beginning or the end of the word.

Identifying Compound Words asks you to decide whether a word is compound or not, and Identifying Affixes asks you to identify plural, prefix, and suffix modifiers—again, simply by pressing a key. Counting Syllables, as the names implies, requires that you press the key number that corresponds to the number of syllables in the object word.

No response requires more than a single keystroke, so knowledge of the keyboard is not necessary, and feedback is instantaneous and unobtrusive. At the end of each lesson, you see your score broken down into the number of each type of answer correct out of number presented and the total elapsed time.

The program includes 1000 words, but there is no provision for adding your own. Presumably, if your attacks on the included words are successful, you can feel confident in your mastery of the word attack skill and move on to other things.

Documentation

The documentation for the program is a 7" x 18" card printed on both sides and folded into three sections. Most of the text on the card is devoted to operating instructions (how to use the menus) and suggestions for mastering the subject matter. Also included are a list of the 1000 vocabulary words and a short catalog of Centurion products.

The style of the documentation is a bit pedantic—"mastery of the subject has been attained and the skill involved is permanently internalized into memory"—but we had no trouble understanding any of the information in it. When we called Centurion about the title, the woman to whom we spoke volunteered that some users had complained about the documentation, causing Centurion to print a supplementary sheet, which we assume addresses these complaints.

The exercise themselves are self-documenting—at least the first one in each lesson is. You get complete instructions with the first question, but for each succeeding question, you must remember that you press 1 if the vowel has a long sound, s if the sound is short, and 2 if the word contains both long and short sounds or whatever the pattern is for that exercise.

Summary

Reading is a serious, businesslike, drill and practice program. It makes no attempt to explain the subjects being studied and is totally devoid of cuteness. It will not win any awards for innovation or design, but neither will it be accused of unsound pedagogy or inaccurate presentation. It is a safe, solid program.

Although it could easily be used by individual students in the home, it is probably better suited to use in the classroom. The ability to add extra words limits the flexibility of the program a bit, and although 1000 words seems like a great many, we suspect that it will not take students too long to master them. A feature that will make *Reading* especially attractive to classroom teachers is the compact coding that allows the entire program to reside in memory, so that once it is loaded, the disk can be removed and stored safely.

For down-to-earth practice in attacking words, grab your sword and do battle with *Reading* on your Apple.

CIRCLE 413 ON READER SERVICE CARD

SOFTWARE PROFILE

Name: Principal Parts of Verbs
Type: Educational program
Suggested Age: Junior high
System: Apple
Format: Disk
Summary: Basic drill and practice in an unexciting format
Price: $24.95
Manufacturer:
Intellectual Software
798 North Ave.
Bridgeport, CT 06606
(800) 232-2224
(203) 335-0906

Principal Parts of Verbs

Principal Parts of Verbs is number 12 in the Practical Grammar series from Intellectual Software. Like *Reading*, it is a no frills package that offers valuable practice in an often neglected subject area.

There is nothing visually or aurally exciting about this program—unless, of course, you are inspired by the Apple II character set. You start by typing in your name and then move on to a menu, which lists the 10 modules included in the program: basic Forms of Verbs, Troublesome Verbs, Exercise 1-2, Exercise 2-3, Lie and Lay, Sit and Set, Rise and Raise, Assignment 1-2, Assignment 2-3, and Progress Test.

The modules are numbered in increments of five, starting with L10, and to select one you must type in the entire three-digit code number of your choice. This is not a friendly approach, and we wonder why a simple 1 through 10 numbering system would not have done as well.

Your module selected, you move into the program itself where you are first

presented with a paragraph explaining the concept under consideration. At the end of the paragraph (while the paragraph is still on the screen) you are drilled on the information you have just learned. The first questions are usually multiple choice; later you may be asked to test your knowledge by typing a specific requested form of a verb, i.e., past tense plus present participle.

If your answer is correct, you are so informed, and a small solid square appears on the right side of the screen to tell you that hitting any key will allow you to go on. We found this convention difficult to get used to and wasted quite a bit of time staring at the screen waiting for the next question to appear when we had simply forgotten to press a key.

If your answer is wrong, the program tells you what the correct answer is and offers a brief explanation. You are never told that the answer is wrong.

The drill sections offer quite a few different types of questions, and while most of them were not difficult to figure out, a few required several tries before we mastered the exact format. In the section on lie and lay, for example, we were asked to "Type the correct form then indicate whether the sentence requires the verb A lie or B lay." Faced with sentence "Mother (has laid, had lain) on that couch often"[the lazy slug!], we were not sure whether to include the auxiliary verb *has* in our answer, and then we typed lie instead of the code letter A, resulting in the recording of an incorrect response in the management section of the program.

Upon completion of each module, the program displays a small chart which tells you the number of items in the module, the number you got correct, and the percentage you got correct.

This package definitely has some rough spots, but the most serious flaw in it is the practice of displaying incorrect forms. When a choice must be made, instead of providing the present tense form of the verb (throw, for example) in a sentence like "The boy—the ball," the program shows you a totally incorrect—often nonexistent—word like "throwed." We think this is a very poor practice.

Management

For an additional $10, you can buy any of the Intellectual Software grammar series disks with a management system. This is virtually transparent to the student user and provides the parent or teacher with a method of tracking the progress of up to 10 students. Unless you are a classroom teacher who plans to work with only one small group of students at a time, however, this bare bones record keeping feature is probably not worth the extra money.

Documentation

The manual for the program is an 18-page small format booklet devoted primarily to listing the packages in the series. There are also short sections on running the program and the management system.

The booklet does refer to "the Practical Grammar texts included with Review and Comprehensive Grammar packages," but since we did not receive either of these packages, we cannot comment on it. We can say that the documentation that we received rates as barely adequate.

We would also like to refer the writer of the booklet, whose repeated use of construction such as "... enter his or her name exactly as they did the first time they used the disk" gave us serious misgivings about the entire program before we even booted the disk, to Intellectual Software's program number 7, *Agreement of Pronoun with Antecedent.*

There is nothing logical about the past participles of most of our irregular verbs, and the only way to learn them is to practice using them over and over.

Summary

Principal Parts of Verbs lacks the professional polish that we have come to expect in educational programs. If the copyright notice had not been dated 1984, we might have suspected that the disk had fallen into a time warp; it is a program that might have represented the state of the art in 1978.

Although it does offer brief explanations of the topics being drilled, we consider it primarily drill and practice. We do, however, think that principal parts of verbs need to be drilled. There is nothing logical about the past participles of most of our irregular verbs, and the only way to learn them is to practice using them over and over. For this, as we know, computers are well suited.

Principal Parts of Verbs is a very basic sort of program, and if you happen to be searching for a program to drill the basic skills it treats, it should be adequate. It is also relatively inexpensive if you don't add the management system. So, if you don't mind students being shown incorrect verb forms, *Principal Parts of Verbs* may be a cost-effective way to provide them with practice in some important skills.

CIRCLE 414 ON READER SERVICE CARD

Adjectives

Adjectives: Adding New Ideas to Nouns and Pronouns, although a member of the Intellectual Software family of grammar programs, has quite a bit more going for it than *Principal Parts of Verbs.* Like *Verbs,* it is a no frills, less than professional effort. Unlike *Verbs,* it has no fatal flaw that we were able to discern.

The modules offered on the main menu include: Introduction, Identify Adjectives, Nouns Modified, Kinds of Adjectives, Kinds-Adjectives II, Position-Adjectives, Nouns as Adjectives, Comparison of Adjectives, Irregular Adjectives, and Review. The selection process is the same as for Verbs.

Again, the program presents an explanatory paragraph and goes on to test your mastery of the information presented with simple exercises. Initially, for example, you see a noun modified by an adjective, and you must type the adjective. Later, you are asked to pick the adjective out of an entire sentence.

As you progress through the program, you learn that there are different kinds of adjectives—limiting, descriptive, predicate, et al.—and you are required to identify them as they appear in context. In the sections on comparison of adjectives and irregular adjectives, you just fill in the blanks: good,—,worst.

Correct answers are rewarded with one of a seemingly endless supply of adjectives and phrases: Cool!, Beautiful,

SOFTWARE PROFILE

Name: Adjectives: Adding New Ideas to Nouns and Pronouns
Type: Educational program
Suggested Age: Junior high
System: Apple, IBM PC
Format: Disk
Summary: Efficient, if unimaginative, drill on types and uses of adjectives
Price: $19.95
Manufacturer:
Intellectual Software
798 North Ave.
Bridgeport, CT 06606
(800) 232-2224
(203) 335-0906

Give your children more than the advantage of a computer. Give them the Scholastic Advantage.

You probably realize the computer is only the first step. Now you need Scholastic Software to turn it into both a powerful and entertaining learning tool for your child.

Scholastic Software is the only software that comes with the Scholastic Advantage. This means software which uses your child's own natural curiosity and love of adventure to make learning valuable skills fun. Software based on what your child is actually studying in school, which makes it relevant and practical. And software which is already being used successfully by millions of kids in schools around the country.

At Scholastic, we've put everything we've discovered about how youngsters learn into our new software line. It's the result of over 60 years' experience making learning both challenging and fun. In fact, you probably grew up reading Scholastic books and magazines in school. Nobody else knows kids like we do and it shows in our new family of products. That's the Scholastic Advantage.

Our software family includes *Agent U.S.A.*, which turns geography into an exciting adventure trip around the country; *Story Maker,* a program that helps kids create their own illustrated story book, and *Math Man,* an action game that makes learning math fun. *Microzine* is America's most popular classroom software, featuring four fun learning programs on one disk. *Story Tree* is both a creative writing tool and a word processor, and *Operation: Frog* is a fascinating simulation of a biology lab.

So give the Scholastic Advantage. You'll be surprised how fast the computer becomes one of your child's favorite—and most exciting—teachers.

Agent U.S.A. available in Apple, Atari, Commodore and IBM. Story Maker and Microzine available in Apple. Math Man and Story Tree available in Apple and IBM. Operation: Frog available in Apple and Commodore. Spelldiver available in Apple, Atari and Commodore.

Clip this and save $5.00 on any purchase of Scholastic Software!

Not a store coupon. Redeem by attaching dated cash register receipt and warranty card. Send to: Scholastic Software, Dept. C.M., 730 Broadway, New York, NY 10003.

Name_____

Address_____

City_____ State_____ Zip_____

Store name_____

Product purchased_____ Computer owned_____

Offer good September 15, 1984–January 31, 1985. Limit one per family and one per product.

Scholastic

The Most Trusted Name in Learning

CIRCLE 188 ON READER SERVICE CARD

Now your teenagers can learn from teachers who teach teachers how to teach.

Introducing The Series by Master Teachers from Thoroughbred.

This unique series offers your teenagers the rare opportunity to learn—to reinforce and integrate concepts studied in school—through software developed by Master Teachers.

Teachers who have been recognized by other teachers as being truly outstanding for their knowledge. And for their ability to inspire people to learn—not by rote, but through *active participation*. So that learning is quick, thorough, and fun.

Master Teachers are so good at teaching, in fact, they teach *teachers* how to teach.

The first 11 titles are available now

Biology

- ☐ Exploring that amazing food factory, the leaf
- ☐ Photosynthesis: unlocking the power of the sun
- ☐ The fascinating story of cell growth
- ☐ How plants grow: the inside story

Math

- ☐ Decimals made simple
- ☐ Mastering units of measurement
- ☐ Taking the mystery out of metrics

Social Science

- ☐ The U.S. Constitution: our guarantee of liberty
- ☐ The Constitutional amendments: what they mean to you

Chemistry

- ☐ Molecules and atoms: exploring the essence of matter
- ☐ The how's and why's of migrating molecules

And more to come—in these subjects, as well as English, physics... All, with advanced color graphics.

Level of knowledge covered: from junior high to adult (except "Decimals," elementary to senior high).

For use with: IBM PC, PCjr.* Available soon for Apple IIe, IIc.**

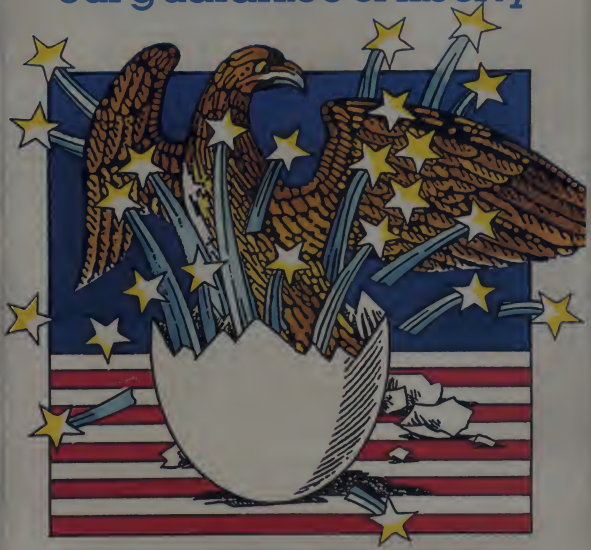
Visit your dealer *today*. Or call us at 800-526-3968 (or 201-685-9000). Or write to SMC Software Systems, 1011 Route 22, Bridgewater, NJ 08807.

*IBM is a registered trademark of International Business Machines Corporation.
**Apple is a registered trademark of Apple Computer, Inc.
© Copyright 1984 Science Management Corporation. All Rights Reserved.

CIRCLE 193 ON READER SERVICE CARD

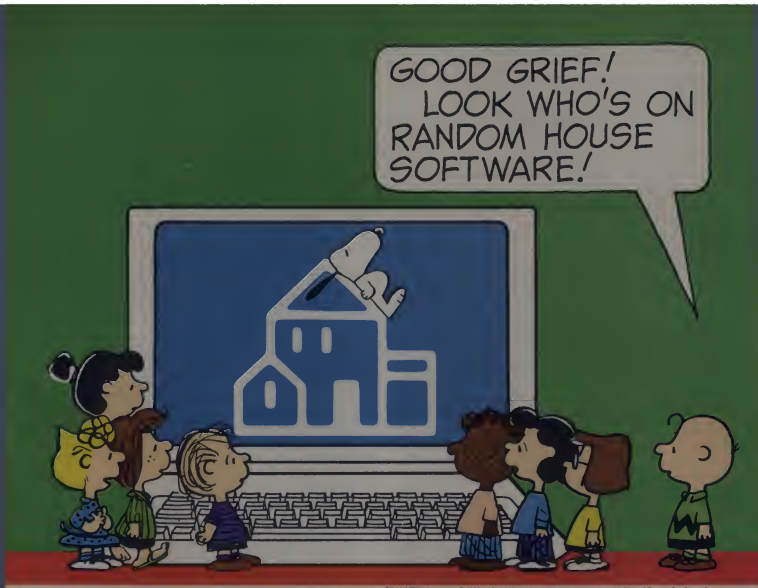
The Series by Master Teachers

The U.S. Constitution: our guarantee of liberty



Thoroughbred

Social Science Educational Software



PEANUTS Characters © 1950, 1951, 1952, 1958, 1960, 1963, 1966, 1968, 1973, United Feature Syndicate, Inc

One of the world's leading children's book publishers and the world's best-loved characters are together again.

The results are these brilliant new PEANUTS® programs for your children.

They'll learn spelling, vocabulary, math and, above all, learn to love learning.

Each of these exciting new programs uses vivid color graphics and truly lifelike animation designed for your home computer.† Plus they're on *two*-sided disks to give you *twice* the fun for the price of one.

Visit your neighborhood computer software dealer now and bring back some bright new friends for your children. The kind of friends who never have to go home.

RANDOM HOUSE
Software

ALL THE BEST FROM OUR HOUSE TO YOUR HOUSE.

†For Apple II+ IIe, IIc. Soon for Commodore 64—disk drive only. ‡Trademarks of Apple Computer, Inc. & Commodore Electronics Ltd. © 1984 Random House, Inc. All rights reserved.

CIRCLE 191 ON READER SERVICE CARD

CELEBRATE
creative computing's
10th ANNIVERSARY

YES I want to be an active part of CREATIVE COMPUTING's future. Please enter my subscription and send me my 10th Anniversary Commemorative Clock upon payment!

☐ One year (12 issues) for $19.97. I SAVE 20%!

☐ Two years for $36.97. I SAVE 26%!

☐ Three years for $49.97. I SAVE 33%!

Mr/Mrs/Ms_____ CC 55365
please print name in full

Company_____

Address_____

City_____ State_____ Zip_____

Savings based on full one-year subscription price of $24.97.

Check one: ☐ Payment enclosed ☐ Bill me later

Charge my: ☐ American Express ☐ Visa ☐ MasterCard

Card No._____ Exp. Date_____

Offer valid in U.S. and possessions only. Please allow 30 to 60 days for delivery of first issue.

Special Money Saving offer!

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 66 BOULDER, COLORADO

POSTAGE WILL BE PAID BY ADDRESSEE

creative computing

P.O. Box 5214
Boulder, Colorado 80321

I can't fool you, and so on. As above, the response to an incorrect answer is simply the correct answer.

The documentation is the same sort of amateurish booklet provided with *Verbs*, and unless you have an IBM PC and need help transferring DOS to the program disk, you will find little of use in it.

The management system is the same as the one reviewed above—save your money and let the kids record their scores on a piece of paper.

Summary

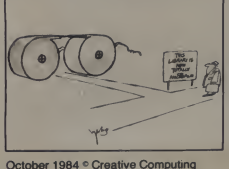
Teaching students to identify and use the parts of speech correctly is a task that has been neglected by contemporary teachers of English—partly, perhaps, because it is neither an easy nor an especially interesting topic to teach. As we have said before, we regret this trend and are happy to find the occasional computer program that recognizes the value of some of the "old fashioned" educational concepts.

We feel quite confident recommending Adjectives to those who share our conviction that learning the mechanics of the English language is still worthwhile.

Unfortunately, the format of *Adjectives* is uninspiring. It is also inoffensive, however. We prefer straightforward, unpretentious text drill and practice to some of the hokey game formats that manufacturers think secondary school students will tolerate.

We feel quite confident recommending *Adjectives* to parents and teachers who share our conviction that learning the mechanics of the English language is still a worthwhile occupation. ■

CIRCLE 414 ON READER SERVICE CARD



Read Any Good Minds Lately?

With the Mind Prober™ you can. In just minutes you can have a scientifically accurate personality profile of anyone. This new expert systems software lets you discover the things most people are afraid to tell you. Their strengths, weaknesses, sexual interests and more. Mind Prober. Another insightful product from the Human Edge™ Software Corporation. Call 1-800-624-5227 (in California 1-800-824-7325) for more information on the location of the nearest retailer.

IBM • Apple • Macintosh • Commodore

Mind Prober

Software That Lets You Read People Like A Book.

CIRCLE 148 ON READER SERVICE CARD

Precision Data Products
P O Box 8367
Grand Rapids MI 49508
Outside U.S.A. (616) 452-3457
Michigan 1-800-632-2468
Outside Michigan 1-800-258-0028

3M Brand Diskettes @ + Toll-Free Ordering = Error Free Performance

Our New Low Prices!

VISA

Precision Data's Prices
Unlimited Warranty on All 3M Diskettes

3M 5¼" Diskettes
Deluxe boxed product complete with Tyvec Envelopes, Write Protect Tabs and Labels. Soft or Hard Sector
Per Diskette (orders of 50 or more)
Sold in Boxes of 10

	Single Side Double Density	Double Side Double Density
	$1.62	**$2.19**
SS DD 96 TPI RH		$2.45
DS DD 96 TPI RH		$3.05

ATTENTION
•Software Duplicators • Bulk No Logo Diskettes
Call for Special Pricing

3M Head Cleaning Diskette Kit **$21.00**

FREE *SHIPPING WITH DISKETTE ORDER*
Use on a regular basis to eliminate particles of dirt, dust and oxide that accumulate with normal use of your system; helps eliminate downtime and service call interruptions. *GOOD FOR 30 CLEANINGS*

3M Certified Data Cartridges

DC 300XL	$20.65
DC 600A	$23.05

COMPLETE LINE OF 3M DATA RECORDING PRODUCTS
Quantities less than 50 Diskettes, add 10% **Shipping & Handling:** $3.00/100 or fewer Diskettes, $3.00/5 or fewer data cartridges. Continental U.S.A. MI Residents, add 4% Sales Tax. C.O.D. add $2.00 **MINIMUM ORDER: $50.00.**

ORDER NOW!
WE WILL NOT BE UNDERSOLD!

CIRCLE 161 ON READER SERVICE CARD

Software for Learning Mathematics

We evaluate 25 software packages and find both winners and lemons.

David H. Ahl

In the 18 writeups in this roundup, you will find evaluations of 25 packages consisting of more than 40 individual programs, all aimed at one or another facet of mathematics learning.

The overall quality of educational packages has steadily improved over the years; however, there are still a disturbing number of packages on the market that can be only described as "swillware." Also, we keep hoping to see more innovation rather than just another batch of arithmetic drill and practice programs in a different guise.

In keeping with our policy of running absolutely honest reviews, we have called a spade a spade and a lemon a lemon. We found excellent packages from both large publishers as well as small, "unknown" vendors, evidence that the software business is still a wide open field. Some of the worst programs had the brightest packaging, proving, again, that you can't judge a book by its cover.

Math Blaster

Math Blaster has been on the educational programs best seller list for months and months, and with good reason. It is an interesting and motivational approach to arithmetic drill and practice with some important extras—in particular, drill on fractions and decimals, and the ability to enter your own problems.

The package comes on two disks, a program disk and data disk. The data disk contains more than 600 math facts/problems: 20 to 30 in each of five skill levels for each of five operations (addition,

Math Blaster

subtraction, multiplication, division, and fractions/decimals).

The *Math Blaster* package includes four types of exercises on the disk. The first is called Look and Learn; it displays each math fact, e.g., 4 + 6 = 10 in each file. Each fact stays on the screen for four seconds, although by pressing the arrows, you can increase or decrease the display time.

Build Your Skill presents the math facts as problems (4 + 6 = ?) in groups of ten. At the end of a group, you are presented with your total elapsed time to answer all the questions, number correct, and percentage score.

Challenge Yourself is a similar type of exercise, except that an operand is the missing piece (4 + ? = 10).

Math Blaster itself is an arcade type game in which you are presented with a problem at the bottom of the screen and four possible answers overhead. Using the keyboard or a joystick, you must position a little man over the mouth of the cannon under the correct answer. Pressing the fire button causes the man to be hurled—human cannonball style—at the answer which bursts like a balloon when he hits it.

At the left is a seal bouncing a ball on its nose; this serves as a timer. You must shoot the man before the ball returns to the seal's nose, a considerable challenge if you choose a high playing speed. Also, at higher speeds the problem and answers are displayed for only a second or two rather than remaining on the screen.

You must also watch the descending balloon on the right side; if it hits the needle on the ground it pops and the game ends. You can bounce the balloon back up as it nears the ground, but it

Top Modem

- Hayes Compatible
- More Features
- Only $495

The best price/performance ratio of any 212A modem on the market today for under $500! That puts ProModem 1200 on top of the stack. Compare the 26 features. You'll see why. Only ProModem offers all 26. 15 are exclusive.

They're important features. The Real Time Clock/Calendar for example. Used with Applications Programs, or the OPTIONS PROCESSOR, gives you pre-set timed operation of the modem. Also, time and duration records of all calls. The convenient HELP command makes ProModem easy to use. It promptly displays the instructions Menu whenever there's a question about what to do next. With Call Progress Detection, you can "tell" ProModem to do things like automatically "Redial When Busy."

It's the only modem that lets you expand into a full telecommunications center with add-ons. The OPTIONS PROCESSOR gives you Data Store and Time Base Continuity with battery backup, Personal/Business Telephone Directory, and Automatic Receipt/Transfer Buffer, expandable to 64K. The OPTIONS PROCESSOR also enables ProModem to operate unattended, with or without your computer.

The optional 12-character ALPHANUMERIC DISPLAY indicates modem operating status, system diagnostics, message status, phone numbers, and real time clock data. . . to name just a few.

Together, these standard and optional features give you a sophisticated electronic mail and communications capability unmatched by any other modem in this class. And, there's more. See your local dealer for additional information and a demonstration. He'll show you why ProModem 1200 is tops.

ProModem 1200 from . . .

PROMETHEUS®

Prometheus Products, Inc., 45277 Fremont Blvd., Fremont CA 94538, (415) 490-2370

NOW AVAILABLE
- ProModem plug-in cards for IBM PC and Apple II
- ProCom Software

212A Modem Comparison Chart *

STANDARD FEATURES	PRO	HAYES STACK	NOVATION SMARTCAT+	ANCHOR 1200	US ROBOTICS PASSWORD
300/1200 Baud (212A)	✓	✓	✓	✓	✓
Intelligent Microprocessor	✓	✓	✓	✓	✓
Tone and Pulse Dialing	✓	✓	✓	✓	✓
Hayes Command Compatible (Works with Smartcom™)	✓	✓		✓	
Additional telephone jack with exclusion switching	✓				
Analog loop back self test	✓		✓		
Self Test at Power Up	✓	✓	✓	✓	✓
Call Progress Detection (Busy, Dial Tones, Trunk Busy, etc.)	✓				
Speaker and External Volume Control	✓	✓	✓	✓	
Full Complement of Status Lights	✓	✓		✓	✓
8 Switch Selectable power-up defaults	✓	✓	✓	✓	✓
Adaptive Dialing	✓				
Auto Redial on Busy	✓	✓	✓	✓	✓
Ergonomically designed easy to read front display panel	✓				
Internal Stand-Alone Power Suppry	✓				
Built In Real Time Clock/Calendar	✓				
Help Command	✓				
300 baud connect while maintaining 1200 baud RS-232 link	✓				
EXPANDABLE OPTIONS					
Automatic Receiver Buffer	✓				
Automatic Transmit Buffer	✓				
On-board Personal/Business Directory	✓				
Buffer, Expandable to 64K	✓				
Auto Logon Macros	✓				
Auto message transmission to groups of numbers	✓				
Records call duration	✓				
12-character Alphanumeric Display	✓				

*Comparison made by Prometheus on the basis of the best information available to Prometheus at time of printing.

CIRCLE 172 ON READER SERVICE CARD

BASF QUALIMETRIC® FLEXYDISKS. A GUARANTEED LIFETIME OF OUTSTANDING PERFORMANCE.

BASF Qualimetric FlexyDisks feature a unique lifetime warranty, firm assurance that the vital information you enter on BASF FlexyDisks today will be secure and unchanged tomorrow. Key to this extraordinary warranted performance is the BASF Qualimetric standard... a totally new set of criteria against which all other magnetic media will be judged.*

You can count on BASF FlexyDisks because the Qualimetric standard reflects a continuing BASF commitment to perfection in magnetic media. One example is the unique two-piece liner in our FlexyDisk jacket. This BASF feature traps damaging debris away from the disk's surface and creates extra space in the head access area for optimum media-head alignment. The result is a guaranteed lifetime of outstanding performance.

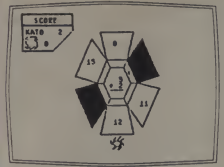
For information security that bridges the gap between today and tomorrow, look for the distinctive BASF package with the Qualimetric seal. Call 800-343-4600 for the name of your nearest supplier.

*Contact BASF for warranty details.

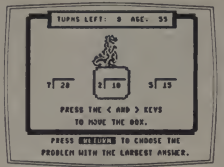
CIRCLE 107 ON READER SERVICE CARD

ENTER TOMORROW ON BASF TODAY. BASF

1983 BASF Systems Corp., Bedford, MA



Tri-Math: Alien Intruder



Tri-Math: Digitosaurus

Math Maze

costs you precious time.

At the end of a game, you are shown the total score which is a function of the problems you got correct and the speed of play.

Entering a new data file with problems that may be particularly troublesome to you (or your child) is as easy as simply typing the problem itself. In addition, the file editor includes a mini command set (edit, list, insert, delete, save, get, print, clear, quit, and help).

The program is well-designed and graphically appealing, and it should hold the attention of children in the age range of 6 to 12. All in all, *Math Blaster* is a real blast!

Tri-Math

As its name implies, *Tri-Math* includes three games that provide drill in arithmetic and problem solving.

Alien Intruder is a game in which you must answer simple arithmetic problems. A problem appears in the center of your circular spaceship. Each wing contains a number, one of which is the right answer. Using the arrow keys, you must select the wing on which the right answer is displayed before the buzzing alien (looks like a spinning spider or circular saw blade) lands on that wing. If you select the correct answer, that wing is filled with anti-alien juice and you move one step closer to warding off the attack. If you select the wrong wing or do not get to it in time, the alien eats it.

At the end of a round, a graphic summary of the score is shown. When you begin, you specify what type of problems you want and the number of wings you want on your ship. You can also use the Pre-Set Control Option to make the game easier or harder by changing the speed of the alien and choosing easier or harder problems.

Digitosaurus is a game in which you must help a creature get older and wiser by choosing the arithmetic expression on the screen with the largest value. After you choose an expression, you must evaluate it. Hence, if you choose 235 + 90, you must enter the value 325.

Tri-Math: Math Mansion

Although it may seem that you are only doing one problem of the three, to choose the right expression, you must either calculate or estimate the value of all three. We like this type of game since it reinforces both calculating and estimating skills. As with Alien Intruder, you can use the pre-set option to make the problems easier or harder.

At the outset we must confess that Math Mansion was our favorite program of the three. It is a delightful combination of a graphics adventure game with arithmetic drill. In Math Mansion, you start in the library of a 14-room house. To enter another room, you must complete an arithmetic expression such as 78_ _ = 13. Note that you must supply both the operator and an operand. In most cases, there is more than one way to complete the expression; in the example, both 78 - 65 = 13 and 78 ÷ 6 = 13 would work. Thus, the program is suitable for children with a wide range of math skills.

As with "real" adventure games, many of the rooms contain something that is necessary to solve a later dilemma (for example, the candle scares the bats), but to pick up an object, again, you must complete a math expression correctly. You are not penalized for an incorrect answer; you just stay in one spot.

There are many ways of playing the game. A floor plan is in the instruction manual; use it as you play and you can get out in 15 or 16 moves. Wander around aimlessly and it could take 60 or 70 moves. Or you can systematically keep track with pencil and paper. How you play is up to you, but by the time you get out, you will have learned a little bit about adventuring and a great deal about math expressions. All in all, a very nice package.

Math Maze

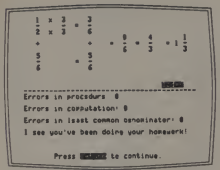
When we first read the instructions, we were tempted to say that *Math Maze* is just another—ho, hum—arithmetic drill and practice game. And in a sense, it is. But in another sense, it is far more because it provides a high level of motivation that keeps kids coming back for more.

To play the game, you move a fly through a maze to pick up numbers to answer a math problem on the lower left of the screen. You may choose to do problems of addition, subtraction, multiplication, or division (only one operation per set of ten problems). You select one of three levels of problem difficulty. For example, in addition drill, you may select sums up to 10, sums up to 20, or metal math (sums with a carry).

The disk contains 40 mazes of varying degrees of difficulty. Furthermore, you can change these mazes to suit yourself, or you can design your own mazes which can then be stored on a data disk for future use. To make things even more interesting, there are four maze skill levels: 1.) no hazards, 2.) with a spider, 3.) invisible walls, and 4.) spider and invisible walls. The game can be played from the keyboard or with a joystick; at higher skill levels, a joystick is almost mandatory.

The instant a new problem appears, a bonus point display starts counting down from 100. When you complete the problem correctly, you get as many points as are then showing on the display. However, you lose points for an incorrect answer or for being captured by the spider.

From this description, it should be apparent that *Math Maze* is an interesting game in its own right. The 40 mazes, coupled with those you may choose to create yourself, will keep youngsters coming back for months, honing their arithmetic skills in the process. The only limitation is that the problems tend to be on the simple side; thus we can't see it being used much beyond age 10.


Errors in procedure: 0
Errors in computation: 0
Errors in least common denominator: 0
I see you've been doing your homework!
Press RETURN to continue.

Success With Math

Success With Math

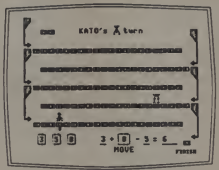
The *Success With Math* series from CBS Software consists of eight packages ranging from *Addition and Subtraction* (grades 1 to 4) to *Quadratic Equations* (grades 9 to 12). We used four of the packages, but we will just describe *Fractions: Addition and Subtraction* as being representative of the series. (For a detailed description of the higher level packages in the series, see *Creative Computing*, April 1984.)

The program provides drill and practice in addition and subtraction of fractions with unequal denominators. At the start, you select either addition or subtraction and the number of problems you wish to do. If you wish, a tutorial set of instructions will "walk you through" a sample problem.

As each problem is presented, you must decide upon the next step (change to least common denominator, add, or reduce). (In subtraction, there are four possible steps.) The program then takes you step by step through the operation. If you make a mistake, the program gives you a hint the first time and the correct answer the second time.

After each problem, you get a mini-summary of errors in procedure, computation, and led, along with an encouraging remark. At the end of each set of problems, you get a similar summary for the entire set.

These packages have no graphics, no sound effects, and no cutesy frills—just a good, comprehensive, self-paced approach to learning. Perhaps most important, the user always succeeds in solving the problem and knows exactly where errors have been made.



Path Tactics

Path Tactics

Path Tactics is one in the first series of five consumer-oriented software packages from MECC. In case you are not familiar with the acronym, MECC stands for the Minnesota Educational Computer Consortium, one of the oldest and largest educational computer using groups in the world.

Long-time readers of *Creative* will recall that several vendors, including Creative Computing Software, used to sell MECC packages. These consumer packages, however, are completely new, although they are based on the same proven educational approaches.

The first five MECC consumer titles are a refreshing change from "more of the same" that we see so often. In addition to *Path Tactics*, the titles are: *The Friendly Computer* (an introduction for children 5 to 8), *Early Addition, Problem-Solving Strategies* (logical thinking for ages 9-15), and *Mind Puzzles* (more logical thinking).

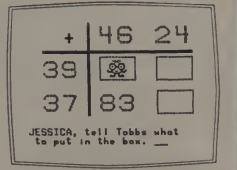
Path Tactics is a game designed to teach basic arithmetic skills. You may play against the computer or a friend. You specify what skill you want to practice (addition, division, etc.). Each player selects one of seven robots to make his moves on the field of play.

The playing area is constructed of five girders with 20 spaces on each (100 total). On each turn, you are given two or three numbers with which you must form an expression ($4 + 6$) and then provide the answer. Depending upon the exercise, either the second number of the expression or the answer is the number of spaces that your robot advances.

Eight spaces on the girders are marked with an "X." If you land on one of these, you drop down a level. Also, if you land on your opponent, you send him back ten spaces. Hence, strategy is a factor as well as completing the problems correctly. If you miss a problem, you are told the correct answer, but you don't get to move.

The animation of the robots is delightful, although after a while, the sound gets a bit tedious (there is a program option to turn it off). The program also has a "program manager" option that lets a parent select the type of problems that are available and allows resetting the winner's list (humans only—the computer does not get its name on the winner's list).

We liked this program very much although we recommend it for two human players rather than a human and the computer. In ten games, the computer won every one even though we didn't make a single mistake; that can be mighty frustrating for a child.



Teasers by Tobbs

Teasers by Tobbs

Teasers by Tobbs provides the old standby, arithmetic practice (in addition and multiplication only) in the form of a logic game.

Tobbs is a friendly, androgynous character who lays out a 3 by 3 grid of numbers. In the upper left is a sign (+ or x) which indicates the type of problem. The game can be played by from one to four players each of whom, in turn, must determine the number that goes in the box in which Tobbs is standing. Numbers in the top row are always added to (or multiplied by) numbers in the left column to fill in the boxes. For example, in the illustration, Tobbs is standing in a box that requires 39 to be added to 46 for a sum of 85.

There are six skill levels. In the first three levels, the top and side numbers simply get larger, while in levels 4 to 6 numbers may be missing from the top row and left column. This can get quite tricky forcing you, in some cases, to solve for the entire grid just to fill in a single box.

There is no timer in the program, but solo players may wish to see how many points they can accumulate in a given time, say 15 minutes, and try to beat this in future games. The game is suitable for ages 8 and older and should provide many hours of learning fun.

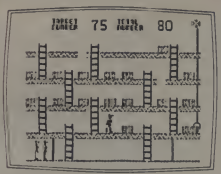
Math Man

The *Math Man* package contains two games, Math Man and Self Test (which presents the same problems as Math Man but without the game elements).

The opening screens ask you to select (using joystick or keyboard) which game you wish, the difficulty level (1 to 12), and speed (four speeds).

In the Math Man game, you find yourself on a system of girders and ladders. At the top left is a target number (say, 83) and at the top right, a "total" number (say, 28). Around the girders are boxes, each with an arithmetic operation (+, -, x, and ÷) and a number emblazoned on it.

Your job is to maneuver Math Man around the girders and pick up the appro-



Math Man

priate boxes to turn the total number into the target number. For example, to turn 28 into 83, we used -7 (28 - 7 = 21), x4 (21 x 4 = 84), +4 and -5. A slowly rising paint bucket on the right side acts as a timer. If it reaches the top before you have calculated the target number, it overturns and drenches the screen in paint, ending your turn.

We found the best playing strategy was to study the problem before pressing the spacebar to start the turn. Once the bucket starts to rise, it is rather nerve racking to deduce a strategy and maneuver Math Man simultaneously.

At lower speeds, either keyboard or joystick is acceptable; at higher speeds, players will surely want to use a joystick.

Completing a problem successfully results in a message "GOT IT" and a few musical notes. We think that a successful player deserves more of a reward than that, perhaps at the end of a round of three problems.

The game is well designed, Math Man is responsive, and the game can be interrupted to change the speed or level. It is a step beyond arithmetic drill and a good prelude to algebra. We recommend it for ages 9 to 14.

Flower Power

No, *Flower Power* is not a 60's trivia game; it is yet another arithmetic drill and practice game. It is called *Flower Power* because your reward for answering a problem correctly is a bright flower in your garden at the bottom of the screen. An incorrect answer results in—what else?—a weed.

After loading the program, it asks for your first name, the type of numbers with which you wish to work (whole numbers, fractions, decimals, or fraction/decimal conversions), and then the type of operation (+, -, x, ÷).

Ten problems are then presented one by one in the center of the screen. Your

Flower Power

score depends both upon the answer you give and the elapsed time. If you answer the early (simple) problems quickly, the program adjusts the difficulty level up. However, if you miss a problem, the level is lowered slightly. Thus, the program should generally provide a sufficient (but not frustrating) level of challenge.

Although the level was self-adjusting, we were not particularly captivated by the program; watching flowers sprout gets old fast. Nor did we like the fact that fractions are written in a straight line (2/3); yes, this is necessary in typing, but most children expect them to be written with the numerator over the denominator. We also think that the program should

Inmac makes it easy to make your computer work harder.

Choose from over 1500 products, all specially selected to help you get more out of your computer.
■ **One-stop shopping.** Paper, connectors, cables, more. Many exclusive Inmac products, too.
■ **Easy ordering.** Mail, phone or TWX. Verbal P.O.'s welcome.
■ **Lower shipping costs.** All 9 Inmac distribution centers are fully stocked, so your order can be shipped from the nearest center.
■ **45-day risk-free trial.** Full refund if not completely satisfied.
■ **Guaranteed quality.** Most guaranteed for one year, some guaranteed for life.

1-800-547-5444.*

inmac

Please send me a free copy of Inmac's Personal Computer Support Catalog.

NAME
COMPANY
ADDRESS
CITY
STATE ZIP PHONE

Inmac Catalog Dept.
2465 Augustine Drive
Santa Clara, CA 95051

*In California, call 1-800-547-5447 for your free catalog.

114130

CIRCLE 169 ON READER SERVICE CARD

Get Into MICROCOMPUTER REPAIR

Train at home in spare time... No previous experience needed

Sales of small computers are running over a billion dollars a year. That's why a whole new business is starting up—devoted entirely to small computer repair. And right now is the time to get in on the ground floor—either working for someone else or in your own computer repair business.

Start making money in electronics

No need to quit your job, change your daily routine or take time from family responsibilities. And you don't waste time going to and from class because you train at home in spare time. The ICS Microcomputer Repair Course is designed for beginners—people with no previous experience who want to get started fast. And you should be ready for an entry-level job repairing small computers even before you finish this course.

You receive microprocessor trainer, digital V.O.M. and much more included with course.

Experts show you what to do... how to do it! We start you fast with the basics, and everything is explained in easy-to-understand language complete with plenty of diagrams and drawings.

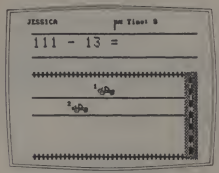
GET INTO SMALL COMPUTER REPAIR

SEND FOR FREE FACTS!

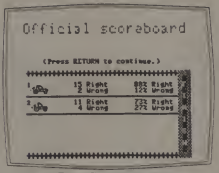
ICS (ANCL 081) **School of Computer Repair,** Dept DH094 Scranton, Pennsylvania 18515

Send free facts and color brochure telling how I can get into computer repair at home in my spare time. No obligation. No salesman will call.

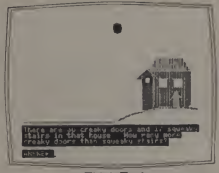
Name _____ Age _____
Address _____
City/State/Zip _____



Race Car 'Rithmetic



Race Car 'Rithmetic



Think Tank

accept decimal answers to four or five places; after all, if a child calculates the value of 3/7 to 0.42857 he should not be told that is wrong because the program is looking for 0.429.

Scores are automatically retained on the disk and may be viewed, printed, or erased from the included utility program, Report.

Race Car 'Rithmetic and Ships Ahoy

Race Car 'Rithmetic and *Ships Ahoy* are—you guessed it—drill and practice programs in the four basic arithmetic operations.

In *Race Car 'Rithmetic*, up to four players may race, although we found that it was rather boring for just a single player. Prior to the start of the race, each player enters the type of problems he wants to do, his skill level (1 to 3) and how many seconds he wants for each answer; this allows players of different ages and abilities to compete fairly.

Then, as problems appear, players take turns in answering. An incorrect answer or no answer within the time limit causes the car to move backward or the player to lose a turn. Unfortunately, the program messages to players are divided into short phrases, only one of which appears on the screen at a time; RETURN must be pressed to see each phrase in a sentence, a rather cumbersome procedure. It takes 13 correct answers to inch your car across the screen to the finish line.

Any player who gets a score of 90% or better (0 or 1 wrong) is given an opportunity to play a short arcade-style race game, a reward that should provide good incentive for completing the rather boring problem part of the program.

Ships Ahoy has two games which provide math drill for solo players. In the first, correct answers propel a ship safely (and slowly) across the screen similar to the race car game. In the second, Mine Sweeper, you must select one of four mines that contains the correct answer to the problem shown overhead.

A third game on the disk is just for fun and lets you maneuver around an underwater maze collecting treasures within a one-minute time period. A fourth "game" is actually a sort of electronic etch-a-sketch.

All the games on these disks are rather slow paced and punctuated by overly long musical interludes. Non-competitive children who prefer a leisurely pace may like them, but they lack the excitement and motivation of some of the other offerings on the market.

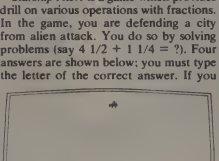
Starship Alert and others from the Wizard

A series of five math packages has been released by The Wizard.

Fraction Tutorial makes extensive use of pie charts and grids to explain how to simplify fractions and perform arithmetic operations on them. The graphics are fine, although we were somewhat put off by the NOPE, TRY AGAIN message that appears after each incorrect response.

This package is aimed at classroom use and has an extensive class management and password system built in. If your name isn't in the class roster, you can't use the disk. However, we don't think that home users should have to go through the cumbersome procedure of building a class file to use the program. (Moreover, on one of our disks, this procedure did not work.)

Starship Alert is a game which provides drill on various operations with fractions. In the game, you are defending a city from alien attack. You do so by solving problems (say 4 1/2 + 1 1/4 = ?). Four answers are shown below; you must type the letter of the correct answer. If you



Starship Alert

select the right answer, the alien spacecraft is blasted from the sky. The graphics are excellent, and the sound effects okay.

However, we are not enthusiastic about the game. Why not? Except at the lowest speed, it is virtually unplayable. Second, since time is so important, you are tempted to look for an answer that "looks right" instead of making sure it is right. For example, on the illustration, a quick glance suggests that the answer is D; of course, if there was another 5 and something fraction, you would have a more difficult time. Hence, the drill really boils down to one of estimation rather than calculation; we feel this loses much of the educational benefit. We also didn't like the fact that if you miss a problem, the program does not indicate the correct answer.

Another package in the Wizard series, *Think Tank*, presents arithmetic problems in a series of graphics settings. The concept is interesting, but the animation sequences tend to drag on. Moreover, the difficulty level is not user-selectable and ranges all over the place. Thus, while the package lists "grades 4 to 9," only an eighth or ninth grader would be able to play the game without getting very frustrated.

Sorry, Wizard, nice try, but your products just don't make it.

Exploring Tables and Graphs

There are two packages in the *Exploring Tables and Graphs* series, Level 1 is for ages 7 to 10, and Level 2 is for ages 10 and up. The packages are substantially similar so we'll describe only Level 1.

Upon loading the disk, you are presented with a menu of five choices: getting started, tables, bar graphs, picture graphs, and area (pie) graphs. "Getting started" simply tells you how to use the keyboard and move around the program. Each of the graph sections allows you to choose a short verbal tutorial, a game ("play and learn"), or examples. The flip side of the disk lets you make, save, and print your own tables and graphs.

Once you know how the keys work, the best place to start is with the game. The games are quite simple and can be played

Can Your Word Processor Keep Up With Your 100 WPM Typist?

It can if you have WordPerfect!

Try this test. While using your favorite word processor, put the cursor in the middle of a paragraph, turn insert on, and type. Surprisingly, very few of the leading word processors can keep up with 70, 60, or even 50 words per minute. WordPerfect keeps up easily at speeds well above 100*.

Now, maybe this doesn't matter to you, because you don't type 100 or even 50 WPM. But you still don't want to wait forever to go to the beginning of your document, go to page 5, save your document, or add a paragraph.

At SSI anything less than fast is unacceptable. And not just because time is money, or because wasting time is foolish. Delays are very frustrating, and frustration can easily lower the quality of your writing.

Try WordPerfect.

WordPerfect

You'll love it—not only for the features we've built in, but also for the delays we left out.

*Based on tests performed on an IBM PC

SATELLITE SOFTWARE INTERNATIONAL

288 WEST CENTER STREET, OREM, UTAH 84057 (801) 224-4000 TELEX 820-618

SSI

CIRCLE 164 ON READER SERVICE CARD

(A subtle merchandising ploy)

TO OUR MANY LOYAL SUPPORTERS, to new computer owners, and to everyone who still believes in the potential of personal computers to make the world a better place, we extend the following, somewhat uncharacteristic offer:

Buy 2, Get 1 Free.*

FINANCIAL COOKBOOK™
New Powerful & versatile financial decisionmaker
IBM-PC, PCjr, Apll. II+, Ile, IIc. C-64 & Atari

LARRY BIRD & JULIUS ERVING GO ONE-ON-ONE™
The best-seller
IBM-PC, PCjr, Apll, II+, Ile, IIc, C-64 & Atari

SKY FOX™
New 3-D flight & combat simulation with 5 skill levels and 15 different scenarios
Apll. II+, Ile & IIc

ARCHON™
Best-seller Award-winner in Omni, Creative Computing, & Softalk.
IBM PC, PCjr, PCjr, Apll, II+, Ile, IIc, C-64 & Atari

ARCHON II: ADEPT™
New Graduate school for Archon addicts. More magic, new icons and battlefields
C-64 & Atari

MUSIC CONSTRUCTION SET™
Composition for anyone who can point a joystick. Multi award-winner
IBM-PC, PCjr, PCjr, Apll, II+, Ile, IIc, C-64 & Atari

CUT & PASTE™
Fast, practical & easy to learn word processor Creative Computing award-winner
IBM-PC, PCjr, PCjr, Apple & IIc C-64 & Atari

REALM OF IMPOSSIBILITY™
New Action & adventure in world of 3-D illusions. Unique 2 player cooperative mode
C-64 & Atari

MURDER ON THE ZINDERNEUF™
A mystery novel in computer graphics. Hesline award-winner
IBM-PC, PCjr, PCjr, Apll, II+, Ile, IIc. C-64 & Atari

PINBALL CONSTRUCTION SET™
The classic Rolling Stone, Omni, Infoworld & Creative Computing awards.
IBM-PC, PCjr, PCjr, Apll, II+, Ile, IIc, C-64 & Atari

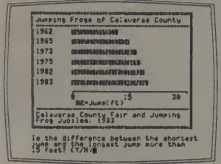
M.U.L.E.™
"Strategy Game of the Year" in Infoworld & Video Review
for 1-4 players
C-64 & Atari

SEVEN CITIES OF GOLD™
New Deep, rich discovery simulation with more than 2800 screens.
Apll, II+, Ile, IIc. C-64 & Atari

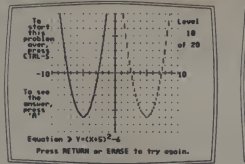
ELECTRONIC ARTS™

HOW IT WORKS: Buy any 2 EA products before Jan. 15, 1985 and send in the coupons enclosed in the packages along with your sales receipt and $3.00 to cover insured shipping. We'll send you any EA product you choose (except Get Organized!) for free

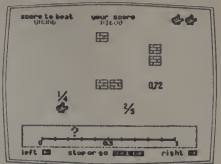
Trademarks and their holders: IBM: PC, PCjr and PCjr: International Business Machines, Inc. Apple II, II+, Ile, IIc: Apple Computer Corp. Commodore 64: Commodore Business Machines, Inc. Atari: Atari Computer Corp. Financial Cookbook: Larry Bird and Julius Erving Go One-On-One: Sky Fox, Archon, Archon II: Adept, Music Construction Set, M.U.L.E., Seven Cities of Gold, Cut & Paste, Realm of Impossibility, Murder on the Zinderneuf: Electronic Arts, Inc.



Exploring Tables and Graphs


To start shot, position cursor press CTRL-S
Level 10 of 20
-10
10
To see the answer, press 'A'
Equation > Y=(X+5)^2-6
Press RETURN or ERASE to try again.

Graphing Equations



Pick the Numbers

with just two keys (one game is a form of Breakout in a circle, while another requires you to open a parachute at the right moment to hit a target). The purpose of the games is to get a few numerical values for plotting on a graph. Hence, it is best to play at least three or four games. The program then takes your scores and puts them in a table; it asks you to provide the labels (name and date).

The program then draws a graph of the results and asks you to identify the longest bar or biggest wedge. If you make a mistake, the program gives you a mild Brooklyn razz and won't accept it.

If you don't want to generate data by playing the game, you can go directly to the examples where you will find "interesting stuff" such as the results of frog jumping contests, weather data, and lengths of the rivers of the world. There are two or three examples for each type of graph.

As mentioned, on Side 2 of the disk is a program for making your own graphs. It is completely menu driven and extremely easy to use, although you will have an easier time if you read the six pages in the manual describing these procedures.

In addition to the double-sided disk, the package includes a 32-page instruction manual and 12 activity masters for reproduction in schools or for individual use at home.

All in all, *Exploring Tables and Graphs* is an outstanding package and on the same professional level as we have come to expect from Weekly Reader Family Software.

Graphing Equations

Graphing Equations is a disk containing an introductory section and four diverse programs.

The first program, Linear and Quadratic Graphs presents graphs on a grid (-10 to 10) for which you must determine the equations. At the start, you have a choice of five types of equations: lines, parabolas, circles, ellipses, and hyperbolas. You also have a choice of beginning with easy problems and working up to the hard ones, beginning anywhere in the list, or practicing problems of mixed difficulty.

The program then selects a graph and plots it. This target graph is shown in one color, while each equation you write is graphed in a second color. You can make successive tries to see how changes in the equation change the graph. When your equation matches the target graph, the program presents another problem.

Once you are familiar with various types of graphs, you will want to move on to Green Globs. In this game, 13 green globs are scattered around the grid. Your job is to write equations (which the program will draw as graphs) and try to hit all the globs with as few equations as possible. In the expert version of the game, five "shot absorbers" are scattered about the grid. Also, in this version, you are allowed to use trigonometric functions (alone or in combination with other functions).

A second game, Tracker, requires you to locate linear and quadratic graphs that are hidden in the grid and determine their equations. You can use two types of "shots" in this game: probes and trackers. A probe travels along a single horizontal or vertical line and marks a point whenever it crosses the path of a hidden graph. A tracker is an equation which, with a bit of luck, will trace the path of the hidden graph.

The last program on the disk is a general equation plotter which will plot practically any type of equation, even ones with log, trig, and exponential functions.

The programs are very forgiving on input. For example, 3 times x can be written 3x (or even x3) just as it would appear in an algebraic equation. The package is well-designed and should be very useful to students studying equations and graphs.

Pick the Numbers

Pick the Numbers is a package of two games that provide practice in ordering decimals and fractions along a number line in a range of 0 to 1.

In the game, you move a pointing hand through a field of barriers and fractions (or decimals or both). You must guide the hand to pick up the numbers while avoiding the barriers. To score, you must pick the numbers in the correct order. For the first game, Pick It Smallest, you must pick the number with the smallest value. In Mystery Pick, you must pick the number represented by the question mark on the number line.

If you hit a barrier, you lose a hand (you start with three and get a new hand for each 5000 points scored). The pointing hand moves upward on its own. You can start or stop it with the spacebar and move it left and right with the arrow keys. You score 100 points for each number picked up correctly and 500 points for correctly picking all the numbers in a round.

There are beginner and advanced versions. In the beginner version, fractions have denominators of 2, 3, 4, or 5, while in the advanced version, the denominators range from 2 to 12, and there are more barriers.

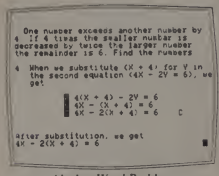
The top ten scores for each game are stored on the disk. The package includes two identical program disks—a thoughtful touch. We found the games were challenging, addictive, and, not incidentally, helpful for learning about decimals and fractions. That's a winning combination!

Algebra Word Problems

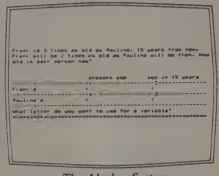
Algebra Word Problems is the fifth disk in a set of five on symbols, number systems, and equations from Intellectual Software. At the outset, we should mention that these disks are designed for classroom use, although that by no means precludes their use at home.

This disk contains ten lesson modules ranging from simple, introductory word problems to more complicated equations with two unknowns. The simpler lesson modules have up to ten problems with two or three questions per problem (forming the equation, reducing it, solving it). Later lessons have only two or three problems, but some of them require up to nine steps to solve. The program takes you step by step through each problem—no jumping to conclusions here!

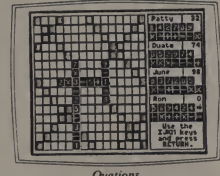
After completing a lesson, the program shows the number of questions that were correct and a percentage score. This summary is also shown if you break out


One number exceeds another number by 4. If 4 times the smaller number is decreased by twice the larger number the remainder is 6. Find the numbers
4 When we substitute (X + 4) for Y in the second equation (4X - 2Y = 6), we get
4(X + 4) - 2Y = 6
4X - (X + 4) = 6
4X - 2(X + 4) = 6
After substitution, we get
4X - 2(X + 4) = 6

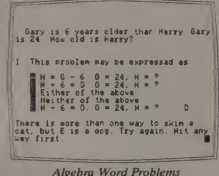
Algebra Word Problems



The Algebra System



Quations


Gary is 6 years older than Harry Gary is 24. How old is Harry?
1 This problem may be expressed as
H = G - 6 G = 24, H = ?
H = 6 = G G = 24, H = ?
Either of the above
Neither of the above
H - 6 = G, G = 24, H = ?
There is more than one way to skin a cat, but E is a dog. Try again. Hit any key first.

Algebra Word Problems

of a lesson by pressing ESC.

Some questions are multiple choice while others require a numeric answer. An incorrect answer brings up an explanation and the question is presented again; a second mistake causes the correct answer to be shown and the program goes on to the next question. In general, there is little feedback—pro or con—except problem explanations and a scoring summary.

For classroom use, the disk contains a classroom management system that records the summary scores of each student on each lesson.

In summary, these are no frills, no nonsense, solid educational programs.

The Algebra System

The Algebra System is a set of programs which gives users practice in solving certain types of one-variable word problems using the "box method."

Upon loading the program, you select one of ten types of problems (three types of age problems, three of rate/time/distance, two of coins, and two of investments). There are more than 20 of each type for a total of more than 2000 on the disk—you won't get bored with this! After selection, the problem is presented on the top part of the screen, and four to six boxes are drawn on the bottom (see example).

Since these are single variable problems, you are asked for the letter you wish to represent the variable and where you wish to place it. The program then asks you to fill in the other boxes with entries (equation fragments) related to the variable. If your response is inappropriate, the program offers the option that you have made a mistake, but it does not give you the correct answer.

When all four boxes have correct entries, you are requested to enter one side of your equation. If the program judges this correct, you are asked for the other side. The computer then solves the equation, but you must calculate the answers to the originally stated word problem. Upon successfully doing so, you are given a short congratulatory message and returned to the problem selection menu.

Frankly, we have never seen a program quite like this one. But not only is it unique, it is easy to use, offers exceptional educational benefit, and is great fun. Our applause to Elaine David for an outstanding package!

Quations

Quations is a game for one to three players (plus the computer) in which players must form equations on a Scrabble type of board. Scholastic terms it a "crossmath" game.

At the start, you select which operations to use (+, -, x, ÷, or a combination). You also determine a time limit for each hand. Each player is dealt six number tiles and seven operation tiles. The objective on each turn is to use as many tiles in your hand as possible, subject to the limitation that only one equal sign may be used. You get points for each number in your equation plus each operation.

Players take turns forming equations which must, of course, intersect with one or more of the equations already on the board. Certain colored squares on the board double and triple the value of the tile or equation placed on them.

After each turn, your hand will be replenished so you always have 13 tiles (until the tile pile is depleted). The game ends when no further equations can be formed. The winner is the one with the most points.

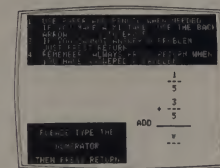
We like *Quations*. The rules are easy to learn and, by varying the operation types and timer, it can be suitable for a wide age range (age 8 to adult). Younger players will want the computer to keep track of scoring, while for older players, tallying up the score of each play is an added challenge (do it wrong and you get no points). Quato, the little androgynous computer player verifies all equations and scores, so no cheating, please.

The Math Doctor

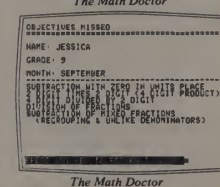
The Math Doctor is an unusual program; indeed we know of no others on the market like it. Basically, it is a tailored diagnostic test on number concepts, the four arithmetic operations, and fractions. The test is geared to the grade level of the user.

The test measures a student's mastery of 39 finely defined objectives such as incrementing sequences, rounding numbers, two-digit sums with regrouping, decimal products, multiplying fractions, and adding mixed fractions with regrouping.

The test usually takes from 20 to 45 minutes to complete. After finishing, a parent or teacher (or student) can view



The Math Doctor



The Math Doctor

Investigate

a b c d e f g h

The latest advances in computer guides and interactive services — **a)** A simple, all-in-one MacIntosh tutorial. **b)** The master guide to selecting the right program. **c)** A complete guide for getting optimal use from the Multiplan software package. **d)** An easy to use interactive videotex service for all computer owners.

The newest in computer graphics, reference, word processing, and ideas — **e)** A complete package for creating your own computer art file. **f)** The #1 reference source for all computer makes, model and languages. **g)** Everything you need to get the most from MacIntosh word processing and graphics. **h)** The first book written entirely by a computer

at Waldenbooks

Check the yellow pages for the one nearest you.

CIRCLE 202 ON READER SERVICE CARD

"Excuse Me,

"Make Way for Hayes' Please."

An advanced, easy-to-use data management system for the IBM® PC and compatibles.

Want to get your paperwork out of a clumsy file cabinet and onto your PC's screen, where you can manage it better? Frustrated with data base software that's either too limited or too difficult to use? Hayes offers you a simple word of kindness.

Please.™ A powerful, yet easy-to-use, system for organizing and managing your information. *Please* is flexible enough to store any data you enter, and it'll return data to you in exactly the form you need. *Please* does more.

It does it all faster. And it's sure to please!

"The menu, Please?"

Menus list all your options and tell you exactly which keys to press for every *Please* feature.

That's to be expected. As the telecomputing leader, Hayes built its reputation on quality design, reliability and customer support. Now these same standards have been applied to a new data management system that is going to instantly change the way you do business!

Say you're looking for an efficient way to maintain sales data. *Please* leads you every step of the way in creating a sales database that might include names, addresses, dates and figures. These categories are called "fields" in database lingo, and they're the very heart of your database structure.

"Make it snappy, Please!"

Need a report fast? You and *Please* can put together a Quick List in a matter of seconds.

Want last month's total in a particular region? Press a few keys and it's yours! A few more keystrokes and you'll know who's moving product, and what's your biggest seller.

Please will supply you with labels for a mailing to selected customers. It can send customer information to your word processor for a promotional letter. And it can receive data from your spreadsheet program. *Please* will even look up a name and company for you; your Hayes Smartmodem* will dial the phone number, and you're ready to talk!

Taking this same sales database, you might also want to define special fields for a custom Output Plan. With a defined field for "COMMISSIONS DUE," *Please* can automatically compute each salesman's commissions, and print them out in a report of your own design. All this and more, just for saying "Please."

And if you ever change your mind and want to change the structure of your database, please feel free. Step-by-step instructions show you how.

You have this same flexibility with any database you and *Please* design. You can store up to 16 million records and 200 custom Output Plans for each database! More than you're likely ever to require. But isn't it nice

equivalent on key-for-key length and key-for-key ... Please is a trademark ... Micromodem ... Smartmodem ... Smartmodem 1200 are trademarks of Hayes Microcomputer ...

Please"

"Put it here, Please."
Design a special screen format to position data in a particular place.

knowing all that storage power is there?

Just in case you ever need it?

Now you might think that a data management system that does all this must be difficult to use. Right? Rest assured. *Please* works hard so you don't have to. An easy-to-follow sample disk shows you everything you need to know to create your first database. Three *Please* menus show you which keys to press to access every feature. And whenever you need it, *Please* provides on-screen HELP messages, tailored to a specific task. So you needn't waste time reading through a list of unrelated instructions on your screen. Or stop what you're doing to consult a manual. In no time at all, and with no assistance at all, you'll be a *Please* database pro!

"Merge these, Please."
Combine data from one database into another, without changing your original.

Everything about *Please* is designed to save you time and effort. So what could make data management even easier? *Please Application Templates*, that's what!

To help you get up-and-running immediately, we've developed a series of practical, pre-designed templates. You'll appreciate their well-thought-out structure and "fill-in-the-blank" ease. Choose several for business and personal use. Including *Mailing List, Membership, Appointments, Household Records, Contacts, Applicants, Employee Files, Inventory, Payroll, Ledger, Invoices, Cash Flow* and *Stocks*. And look for several new templates, before you can say 'More, please'.

See your dealer right away for a demonstration of *Please* (and its templates). You'll wonder how you ever managed information without it!

"My free Template, Please!"
Which template would you like? Mail in your *Please* Product Registration Card, and Hayes will send it to you, absolutely free!

Hayes

Hayes Microcomputer Products, Inc.
5923 Peachtree Industrial Blvd.
Norcross, Georgia 30092 404/441-1617

Hayes is a registered trademark of International Business Machines Corp. 1984 Hayes Microcomputer Products, Inc.

CIRCLE 145 ON READER SERVICE CARD

LAST NIGHT, COMPUSERVE TURNED THIS COMPUTER INTO A TRAVEL AGENT FOR JENNIE, A STOCK ANALYST FOR RALPH, AND NOW, IT'S SENDING HERBIE TO ANOTHER GALAXY.

No Matter Which Computer You Own, We'll Help You Get The Most Out Of It.

If you've got places to go, CompuServe can save you time and money getting there. Just access the Official Airline Guide Electronic Edition–for current flight schedules and fares. Make reservations through our on-line travel service. Even charter a yacht through "Worldwide Exchange."

If your money's in the market, CompuServe offers a wealth of prestigious financial data bases. Access Value Line, or Standard and Poor's. Get the latest information on 50,000 stocks, bonds or commodities. All on line with CompuServe.

Or if, like Herbie, intergalactic gamesmanship is your thing, enjoy the best in fantasy, adventure, and space games. Like MegaWars, the ultimate computer conflict.

To get all this and more, you'll need a computer, a modem and CompuServe. CompuServe connects with almost any personal computer, terminal, or communicating word processor. To buy a Starter Kit, see your nearest computer dealer. To receive our informative brochure or to order direct, call or write:

CompuServe

Consumer Information Service
5000 Arlington Centre Blvd Columbus, OH 43220

800-848-8199
In Ohio call 614-457-0802

An H&R Block Company

CIRCLE 111 ON READER SERVICE CARD

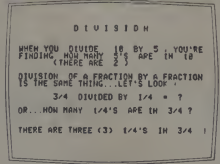
the evaluative results on the screen, print them out, or save them on a data file.

The program does not provide any tutorial material or drill and practice, but points out areas in which either instruction or drill is needed. We feel that the *Math Doctor* is an excellent diagnostic tool and, because of its branching strategy, is much more efficient (and less frustrating for the test taker) than similar pencil-and-paper tests.

Math Alert

Math Alert is a refresher and remedial course in basic arithmetic operations. According to the instructions, "It can help you picture more clearly what really is happening in arithmetic operations."

The disk has 13 modules ranging from number facts to operations with fractions and decimals. Although the manual says you can "work at your own pace" and "move on by pressing the ESC key," we found that this did not work. Thus, you are confined to the rather slow pace of the program.


D I V I S I O N
WHEN YOU DIVIDE 10 BY 5 , YOU'RE
FINDING HOW MANY 5'S ARE IN 10
(THERE ARE 2)
DIVISION OF A FRACTION BY A FRACTION
IS THE SAME THING...LET'S LOOK !
3/4 DIVIDED BY 1/4 = ?
OR...HOW MANY 1/4'S ARE IN 3/4 ?
THERE ARE THREE (3) 1/4'S IN 3/4 !

Math Alert

Indeed, this was just one indication that, despite the good intentions of Micro Program Designs, the package was rather poorly executed. For example, the instructions talk about providing "practise." Words continue from one line to the next and are broken whenever column 40 is reached. For example, on the end of a line, we find THI and on the next line, RTY-SEVEN. If you finish one module and want to go on to the next one, you must go through the entire five-screen opening dialog. Even many of the actual explanations were not at all clear—and we're not exactly math dummies. We could go on, but there is not much point in it. Our recommendation: leave this program on the shelf. ■

Software for Learning Mathematics

Name System Price	Manufacturer
The Algebra System TRS 80 III & 4 $219.00 (demo disk $20.00)	E. David & Associates 22 Russet Lane Storrs, CT 06268 (203) 429-1785
Algebra Word Problems Apple $49.95	Intellectual Software 798 North Ave. Bridgeport, CT 06606 (203) 335-0906
Exploring Tables and Graphs Apple $34.95	Weekly Reader Family Software 245 Long Hill Rd. Middletown, CT 06457 (203) 347-7251
Flower Power C64, Apple $39.95	Software 1669 Acapulco Ct. Petaluma, CA 94952 (707) 762-2172
Graphing Equations Apple $60.00	Conduit P.O. Box 388 Iowa City, IA 52244 (319) 353-5789
Math Alert Apple $29.50	Micro Program Designs 5440 Crestline Rd. Wilmington, DE 19808 (302) 738-3798
Math Blaster Apple, IBM PC, C64 $49.95	Davidson & Associates 6069 Groveoak Pl. #12 Rancho Palos Verdes, CA 90274 (213) 378-7826
The Math Doctor Apple, TRS-80 $40.00	Modern Education Corporation P.O. Box 721 Tulsa, OK 74101 (918) 584-7278
Math Man Apple, IBM PC, PCjr. $39.95	Scholastic, Inc. 730 Broadway New York, NY 10003 (212) 505-3000

Name System Price	Manufacturer
Math Maze Apple, PCjr, C64, Atari $39.95	DesignWare, Inc. 185 Berry St. San Francisco, CA 94107 (415) 546-1866
Path Tactics Apple $29.95	MECC 3490 Lexington Ave. N. St. Paul, MN 55112 (612) 481-3500
Pick the Numbers Apple, C64 $45 (school price) $60 (list price)	D.C. Heath & Co. 125 Spring St. Lexington, MA 02173 (617) 862-6650
Quations Apple $39.95	Scholastic, Inc. 730 Broadway New York, NY 10003 (212) 505-3000
Race Car 'Rithmetic **Ships Ahoy** Apple, IBM PC, PCjr, Atari, C64 $30.95 each	Unicorn Software 1775 E. Tropicana #8 Las Vegas, NV 89109 (702) 798-2727
Starship Alert Apple $34.95	The Wizard 18584 Carlwyn Dr. Castro Valley, CA 94546 (415) 582-8252
Success with Math Apple, C64, Atari $24.95	CBS Software One Fawcett Pl. Greenwich, CT 06836 (203) 622-2525
Teasers by Tobbs Apple, Atari, TRS-80, TRS-80CC $55 disk $39 cassette	Sunburst Communications 39 Washington Ave. Pleasantville, NY 10570 (914) 769-5030
Tri-Math C64 $19.95	Human Engineered Software 150 N. Hill Dr. Brisbane, CA 94005 (415) 468-4111

Expert Systems

Use your microcomputer to better understand yourself and others.

David H. Ahl

Expert advice. The human edge. Understanding people. That doesn't sound like the stuff of microcomputers. Indeed, a recent survey found that many executives don't use computers because they feel their jobs deal with people and computers have nothing to offer them. These executives describe their jobs in terms of power, judgment, and interpersonal skills rather than numbers or things.

Until recently, these executives were right on target. But within the past year things have changed dramatically—in both hardware and software. In hardware, 1983 saw the advent of the notebook computer, a forgiving, easy to learn, easy to use, go-anywhere machine. And in software, we are beginning to see programs that go beyond accounting, spreadsheets, and word processors, programs that begin to touch upon human interactions, negotiations, and the emotional side of management.

I was advised to stop stalls with deadlines, avoid threats, give minimal answers, and use Mr. Mellon's shortcomings to my advantage.

The Negotiation Edge

How would you like to enter your next negotiating situation armed with a seven-page document outlining a recommended strategy for success? I recently spent ten minutes before an important financial negotiating session with a new computer program from Human Edge Software. I was rewarded with a document that told me:

"Mr. Jack Mellon will greet you in a cordial, professional manner. Like you, he is confident about his skills and likely to be knowledgeable about the issues under negotiation. He holds strong opinions and is not easily persuaded. This could pose a problem as you, too, are steadfast in your ideas. In order to avoid this, you may have to be flexible and show some acceptance of his position.

"You are both risk-takers and enjoy dealing with a tough competitor. This can be a very engaging, as well as profitable negotiation for you if you can avoid angry confrontations. Stubbornness is a quality you both share which makes arguing pointless."

Following this brief introduction were two pages on planning a negotiating approach including sections on the anticipated counterpart position, details of recommended tactics and strategies. In this section, I was told that Mr. Mellon may use unfair tactics and that it might be worthwhile for me to create an emotional distraction.

Another single-spaced page recommended the approach to take during the actual process of negotiating. With Mr. Mellon, for example, I was advised to avoid deadlocks. "The two of you can be unyielding at times. If you reach an impasse, the simple tactic of taking turns can be used to please all parties. . ." I was also advised to stop stalls with deadlines, avoid threats, give minimal answers, and use Mr. Mellon's shortcomings to my advantage.

Finally, a one-page section discussed bringing the negotiations to a successful close. I was advised to push Mr. Mellon to settle quickly, use ultimatums as a last resort, make an offer Mr. Mellon couldn't refuse (always good advice), and tie up loose ends. Each of these pieces of advice was backed up by a paragraph describing the likely outlook of both parties and their reactions to various alternative strategies.

Following this five-page negotiation strategy report was a 1½-page summary of the key points titled, Negotiation Game Plan. This was not just a repeat of the subheads in the strategy report but a summary of the key action points: "Find out if Mr. Mellon's time is really limited. Put pressure on Mr. Mellon to make the first offer. Discuss sensitive issues briefly. Meet resistance by explaining the consequences of a failure to agree." In all, there were 15 action points in the game plan.

SOFTWARE PROFILE

Name: The Negotiation Edge
Type: Analysis of human interactions
Authors: Michael Rufflo, Kathy Johnson, Shlomo Malin
System: IBM PC
Format: Disk
Summary: Helps give you the edge in various business and personal situations.
Price: $295
Manufacturer:
Human Edge Software
2445 Faber Pl.
Palo Alto, CA 94303
(415) 493-1593

You've got 33 hours in that spread sheet. Now, it's time to hit "save."

The important work. When you're doing important work, the most important thing in your computer is also the least expensive: the diskette that "saves" your work. That's why smart businesses rely on Janus.

Better by design. The most critical component of a diskette isn't the recording medium. It's the jacket. And once you've crimped or bent the jacket, you can say goodbye to the diskette inside — and all the important work you saved on it. It stands to reason... the stronger the jacket is, the safer your work is.

Janus set the standard. By simply increasing the thickness of the disk jacket by 25%, Janus increased the strength by almost 100%... setting a new standard. And, we set another standard with our absolute no-nonsense guarantee.

Tested. 100%. Janus 8" and 5¼" diskettes aren't simply batch tested. They're individually tested. 100%. Which means they work. And keep working.

The guarantee. If any Janus diskette ever fails to perform, for any reason, your Janus dealer will replace it. Free. No questions asked.

Color coded. Janus diskettes are color coded for your computer, which means you'll never forget which diskette fits what. If you're working in a double-sided, double-density format for instance, just ask for "Janus Blue." "Green" for single-sided, double-density... and so on.

Time is money. The most important thing you save on a diskette is your time. Your work. If that work is important, your diskette is important. Which is why you buy Janus. When you hit "save," it gets saved. That's our guarantee.

JANUS™

For your important work.

Janus Dysc Company, 1860 Barber Lane, Milpitas, CA 95305 (800) 338-0100

CIRCLE 153 ON READER SERVICE CARD

Home Smart Home

Smarthome I™ — Home Control Made Easy

A most appealing new concept for your Apple. Now the age of real home management is here with SMARTHOME I from CyberLYNX. Instead of your Apple™ sitting around all day, resting on its software, it could be keeping you — and your home — secure, warm, cozy, and entertained 24 hours a day. SMARTHOME can really make your Apple shine. This icon software and hardware package lets your personal computer install and monitor a fully wireless home security system with window and door sensors, infrared motion sensors, remote controller, and an alarm center. SMARTHOME also automatically controls lights and appliances so you can come home to a warm, safe, well-lit house with soft music playing and the smell of dinner cooking. And SMARTHOME can do all this without parting away any of your Apple's capabilities because it doesn't dedicate the computer. Since it's wireless, installation is a breeze and it's run by icon-graphic software like you've never seen before for the Apple II family. Best of all, it lets the computer do what you really bought it to do — simplify your life.

Imagine your computer:

- waking your family in case of a fire and turning the lights on for a safe exit.
- alerting the neighbors to a break-in when you're not home.
- calling out for help in a medical emergency when you aren't able to.
- turning on the TV in time for that favorite show with the popcorn already made.
- switching on the hall lights when your children get up at night and turning them off when they forget.
- lighting up the front steps when you pull in the driveway.

For home security so sophisticated it's simple, and home control so simple it's fun — ask for SMARTHOME and install some peace of mind with your Apple today.

The most exciting new product for intelligent home computers is arriving at your dealer's now — see what everyone is talking about — SMARTHOME from CyberLYNX.

For the name of the SMARTHOME dealer nearest you call

CyberLYNX Computer Products, Inc., 4828 Sterling Drive, Boulder, CO 80301 (303) 444-7733

SMARTHOME I is a registered trademark of CyberLYNX Computer Products, Inc. Apple is a registered trademark of Apple Computer, Inc.

CIRCLE 119 ON READER SERVICE CARD

Using the program is simple. Pop the program disk and data disk into an IBM PC. A colorful menu appears. First step: answer a series of 108 questions about yourself. You need do this only once. Then, you are presented with a series of descriptive adjectives; One keystroke says either, "Yes, this describes my opponent" or "No, it doesn't." As I mentioned above, ten minutes saw me through both sections. Then I selected the printout section, the results of which were described above.

Is the package worth $295? Well, while it won't get the same daily use as a word processor or spreadsheet, if you use it just once, the program will pay for itself. I was tempted to say "use it successfully," but frankly I can't imagine it not being successful.

Related Family Members

Instead of describing the other members of the Human Edge family in detail, I think a story tells it better. I recently met a young person (X) whose identity will remain secret. X confided that he/she used *The Sales Edge* program prior to asking for a promotion. "I wasn't really expecting it," said X, "and I was astonished when I walked away from the meeting with both a promotion and a raise. The package really works!" 'Nuff said?

The third package in the business series is *The Management Edge*, a program designed to help increase motivation, solve conflicts, tackle behavior problems, boost productivity, improve supervisory techniques, and influence superiors.

Mind Prober

Combining their extensive experience in the motivations of business negotiations with the interpretation of psychological tests, the principals of Human Edge Software have written a program for practically anyone who would like to create a psychological profile of himself or someone else.

As input, it uses an expanded list of adjectives like that used in the second part of the *Negotiation* package. Generally, after talking with someone (job candidate, peer, friend, or foe) for about one-half hour you will be able to answer most of the descriptive adjectives with a yea or nay. Not all will be absolutely accurate—they never are—but enough probably will be that the program will have adequate information with which to formulate a reasonably accurate profile of the other person.

This profile is formulated by placing the variables in a matrix, one dimension of which is the five basic factors. These include supremacy (leadership, extrovert vs. introvert, and the like); kindness/aggressiveness; emotional stability (do you worry a great deal or are you stable?); conscientiousness/impulsiveness; and a fifth variable which includes culture and intellect—sort of how smart you are and how you apply your skills (would you rather build models or heal people?).

The evaluation matrix has rules and heuristics similar to those that have been in use for years in psychological testing. Once applied, you get a two-page analysis—video or printed—of the subject. Paragraphs describe his career and job involvement, likes and dislikes in other people, personal values, and even his likely attitude toward sex.

For example, about an associate we learned that "Peter often dives into new projects before finishing old ones. He has many irons in the fire, wants to succeed and enjoys being on the fast track.

"Peter has a strong need to seek out excitement in his life, but has difficulty telling others what he needs or wants.

"Peter is a non-conformist—preferring to rebel against authority and social convention . . . Peter loves to do what is shocking and forbidden, and likes to show off his sexual prowess."

The *Mind Prober* package includes a book with seven chapters which describe the basis of expert-based psychological systems, how you can "read" and analyze people and why you should (or shouldn't).

There is more, but this should give you an idea of what you can expect from *Mind Prober*. *VisiCalc* may be the reason you bought your computer, but *Mind Prober* certainly puts the little beast in a new light, doesn't it? ■

CIRCLE 434 ON READER SERVICE CARD

SOFTWARE PROFILE

Name: Mind Prober
Type: Analyzes people
Authors: Kathy Johnson and Jim Johnson
System: Apple, IBM PC, C-64
Format: Disk
Summary: Provides a psychological profile of yourself and others.
Price: $49.95
Manufacturer:
Human Edge Software
2445 Faber Pl.
Palo Alto, CA 94303
(415) 493-1593

MAC / APPLE SPECIALS

MACINTOSH

	Retail Price	Your Price
Blue Chip		
Millionaire	60.00	48.00
Haba Systems		
Habadex	195.00	155.00
Infocom:		
Zork I	39.95	31.95
Zork II	39.95	31.95
Zork III	39.95	31.95
Living Video Text		
Think Tank	145.00	116.00
Main Street:		
Mainstreet Filer	250.00	200.00
Memorax		
3½" Diskette/box	60.00	48.00
Microsoft		
Multiplan	195.00	155.00
Basic	150.00	120.00
Chart	150.00	120.00
Penguin		
Transylvania	39.95	31.95
Prometheus		
Promodem with Mac Pack	495.00	395.00

APPLE

	Retail Price	Your Price
Advanced Logic		
Word Handler	79.95	36.95
Handlers	169.95	84.95
Spell Handler	59.95	29.95
Llet Handler	79.95	36.95
Ankronics		
Jane	179.95	135.00
Broderbund		
Print Shop	49.95	39.95
Print Shop Refills	19.95	16.00
Beagle Brothers		
GPLE	49.95	37.95
Fat Cat	34.95	25.95
Electronic Arts		
Music Const Set	39.95	31.95
One-on-One	39.95	31.95
Financial Cook Book	49.95	39.95
Hayes		
Mach III IIe/II +	59.95	43.95
Krell		
Krell Logo	90.00	69.95
MicroSci		
A2 Disk Drive	349.95	199.95
Software Publishing		
PFS Write	125.00	87.50
PFS Report	125.00	87.50
PFS File	125.00	87.50
Strategic Simulation		
War in Russia	79.95	59.95
Objective Kursk	39.95	28.95
TG Products		
Selectaport	55.00	41.95
Joy Joystick	59.95	43.95
Visicorp		
Flash Calc	99.95	79.95

In Bay Area Visit
SOFTWARE SOLUTIONS
11185 San Pablo Ave.
El Cerrito, CA 94530
Hours. 10 AM-6 PM

MONAGON SOFTWARE
P.O Box 1486
El Cerrito, CA 94530
For Technical Information & Order Status Call (415) 237-8226
800-942-2058
In Calif 800-233-8327
Hours 8 AM-6 PM PDT
For free catalog write to:

CIRCLE 166 ON READER SERVICE CARD

Computers Make Special Education More Effective and Fun

Glenn M. Kleiman and Mary M. Humphrey

We have often encountered teachers, parents, and administrators who believe that special education students should not use computers. They present negative arguments like the following:

Negative Argument #1: Special education students won't be able to use computers. They are too complex and students will only become frustrated trying to make them work. They can't do math or read; how are they going to operate a computer?

Negative Argument #2: They will break the computer right away. Just look at the mess they make of their books and papers.

Negative Argument #3: Their social skills are poor enough now. If you put them on machines they will become even worse at communicating with other students and teachers.

Negative Argument #4: There is too much for the special education teachers to do already. When will they find time to learn to use the computers themselves, teach the kids, and then make sure the computers are used properly and not damaged?

In this article, we describe the experiences of teachers and students in two special education classes into which computers were successfully introduced. Their experiences convinced us that computers can be especially valuable for students with learning problems.

Background

We introduced computers into these classrooms as part of a project that involved developing and testing software designed for spelling drill-and-practice. Twenty-nine children, from 7 to 13 years of age, participated in the project. All the children had learning problems which required special remedial instruction. Eighteen of the children came to a resource room from their regular classrooms for one hour each day. The other eleven children had more severe learning problems and spent the entire school day in a special education classroom. Each child used the computer individually three or four times a week, for 15 to 20 minutes each time. The project lasted ten weeks.

All the students had histories of serious problems with their school work. Their books and papers were quite messy, and their interactions with other students and teachers were poor. These children required a great deal of individual attention from teachers, whose time and patience were often strained.

The four negative arguments we have described claim that computers would increase these problems. However, we found that computers helped alleviate them.

The spelling program successfully increased the rate at which the children learned their words. More importantly,

Computers can be especially valuable for students with learning problems.

we found that the use of computers led to improvements in the children's self-esteem, their interactions with others, and their feelings about school and learning. These benefits are of far more general significance than the learning of spelling words, and so we will focus upon them in this article.

Computers Are Easy to Use

Many educators believe that computers are too complex for students with

What made over 100,000 Apple II owners fall in love with System Saver?

It's the most versatile, most convenient, most useful peripheral ever made for the Apple.*

System Saver™ filters out damaging AC line noise and power surges.
70-90% of all microcomputer malfunctions can be traced to power line problems* Problems your System Saver guards against.

Power line noise can often be interpreted as data. This confuses your computer and produces system errors. Power surges and spikes can cause severe damage to your Apple's delicate circuitry and lead to costly servicing.

System Saver clips surges and spikes at a 130 Volts RMS/175 Volts dc level. A PI type filter attenuates common and transverse mode noise by a minimum of 30 dB from 600 kHz to 20 mHz with a maximum attenuation of 50 dB. You end up with an Apple that's more accurate, more efficient and more reliable

System Saver makes your Apple more convenient to use.
No more reaching around to the back of your Apple to turn it on. No more fumbling for outlets and cords to plug in your monitor and printer. System Saver organizes all your power needs.

It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

System Saver lets your Apple keep its cool.
Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

System Saver's efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots. It leaves your Apple cool, calm and running at top speed.

So if you want to keep damaging heat, line noise and power surges out of your system for good, pick up the only peripheral that's in use every second your computer is in use. The System Saver. You'll soon come to think of it as the piece Apple forgot.

Compatible with Apple stand

Please send _____SYSTEM SAVER(S), $89.95 each Total $_____
Include $2.50 for shipping and handling
New York State residents add applicable sales tax
☐ Check enclosed ☐ Visa ☐ Master Card

Card No. Expires
Name on Card
Name
Address (UPS delivery)
City State Zip Phone

251 Park Avenue South
New York, NY 10010
(212) 475-5200 Tlx 467383 KMI. NY

KENSINGTON™ MICROWARE

*PC Magazine March 1983

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 587 1980 Category A Available in 220/240 Volts, 50/60 Hz

System Saver is a registered trademark of Kensington Microware Ltd
© 1984 Kensington Microware Ltd System Saver is patent pending

CIRCLE 131 ON READER SERVICE CARD

OUR AD # C9

THE WORLD'S LARGEST COMPUTER MAIL ORDER FIRM

ALL MAIL: Conroy-LaPointe, Inc. 12060 SW Garden Place, Portland, OR 97223
SHOWROOMS AT: PORTLAND, OR and SEATTLE, WA — BOTH OPEN M-SAT 10-6

Orders Only TOLL FREE (800) 547-1289

HARDWARE for your APPLE

apple

	LIST PRICE	OUR PRICE
APPLE IIc	CALL	
APPLE MACINTOSH	CALL	
APPLE Inc. STARTER SYSTEM BY APPLE	CALL	
LIMITED WARRANTY is 100% Parts & Labor for 90 days for all		

DISK DRIVES

	LIST PRICE	OUR PRICE
AMDEK Amdisk I Jr. Micro-Floppy 143K	$ 299	$ 249
● CENTRAL PT. Fast Utility & Apple DOS	$ 20	$ 15
CONCEPT		
C1214 Dual Drives, ½ Height, flat pack (Use Apple Duodrive™)	NEW	$ 589 $ 425
C130 (Controller DOS, & PRODOS)	NEW	$ 89 $ 65
µ-SCI ● A2 143K Disk Drive	$ 345	$ 219
A2 Controller Card	$ 100	$ 79
● A40 160K Drive	$ 449	$ 299
MICRO-SCI ● A70 286K Drive	$ 599	$ 299
A40/A70 Controller Card	$ 100	$ 79
TEAC 1/2 HT 143K Drive; 143K $ 349 $ 238		
FLAT 180 Double Sided, 32TK $ 449 $ 329		
1/2 HIGH Controller Card by Cont'l $ 110 $ 49		
Rana Elite 1 163K 40 Track $ 379 $ 239		
Elite 2 320K 80 Track $ 549 $ 349		
Elite 3 655.2K 160 Track $ 849 $ 499		
Elite Controller $ 89 $ 69		

RAM EXPANSION

- Corm X, 80 col. + 64K RAM for IIe (1 Yr. Wty.) $ 199 $ 99
- Corm X, 80 col. + 64K RAM/Mod 1 yr. wty. $ 179 $ 89
- Videx, Video Term 80 col (+ or e) $ 279 $ 189
- Ultraterm (+ or e) $ 379 $ 279
- Soft Video Switch (II +) $ 35 $ 25
- Enhancer II (II +) $ 149 $ 99
- Function Strip (II +) $ 39 $ 29

mo Have Full Videx Line. Call

- Microsoft, RAM Card (II +) 16K $ 160 $ 79
- Titan/Saturn RAM Card (II +) 64K $ 425 $ 229
- RAM Card (IIe) 128K $ 599 $ 329
- Software Call

VIDEO CARDS

	LIST PRICE	OUR PRICE
● Corm X, 80 col. + 64K RAM/Mod 1 yr. wty.	$ 179	$ 89
● Videx, Video Term 80 col (+ or e)	$ 279	$ 189
Ultraterm (+ or e)	$ 379	$ 279
Soft Video Switch (II +)	$ 35	$ 25
Enhancer II (II +)	$ 149	$ 99
Function Strip (II +)	$ 39	$ 29

mo Have Full Videx Line. Call

SOFTWARE for your APPLE

BUSINESS & TRAINING

		LIST PRICE	OUR PRICE
● ALS/Silicon Valley, Word Handler		$ 60	$ 39
List Handler		$ 60	$ 39
● Applied Soft Tech., Versa Form		$ 395	$ 259
Arithmetrics, Jam (+ or e)		$ 175	$ 195
Jane (IIc)		$ 175	$ 119
Artpad, Magic Window II		$ 150	$ 99
● Ashton Tate, dBase II (Req CP/M 80)		$ 495	Call
Friday (Requires CP /M 80)		$ 395	$ 299
BPI Systems, GL A/R AP PR or Mich		$ 395	$ 249
● Brederbund, Bank St Writer or Speller ea.		$ 70	$ 49
Bookkeeping Solutions, Jack 2 (Req		$ 395	$ 269
Incredible Jack (Req		$ 90	$ 69
Continental, GL A/R AP or PR, each		$ 250	$ 165
Inventory Management		$ 75	$ 49
CDE/Life Vascular, Multiplan, Apple Baseball		$ 60	$ 40
Dow Jones, Market Analyzer		$ 250	$ 225
Market Manager		$ 300	$ 195
Market Microcomputer		$ 140	$ 109
Fox & Geller, Quickcalc or iQCalc, ea.		$ 75	$ 59
iQEntry (for dBase III)		$ 150	$ 65
Hayden, Pie Writer		$ 70	$ 49
Harvard, Harvard Project Manager		$ 795	$ 495
● Howard Soft, Tax Preparer, 1984		$ 250	$ 185
Knowara, Knowara	NEW	$ 95	$ 64
Lewis Wickerhart, Think Tank	NEW	$ 150	$ 99
LJK, Letter Perfect w /Mail Merge	NEW	$ 150	$ 99
Micro Pro, (all require CP/M 80 Card)			
● WordStar + + Applicard & C/PM SPECIAL		$ 495	$ 295
● WordStar Professional, 4 Pak SPECIAL		$ 695	$ 395
● WordStar + + Training Manual		$ 495	$ 299
● SpellStar + + Add-On SPECIAL		$ 150	$ 95
● SpellStar + + for MailMerger + + SPECIAL		$ 250	$ 125
● InfoStar + + Professional, 4 CP/M SPECIAL		$ 495	$ 295
Microsoft, Multi-Plan (Req DOS or CP/M)		$ 195	$ 129
● Osborne/McGraw, (Disk and Book) Stat, Bus. & Math			
Some Common Basic Programs (75 ea.)		$ 180	$ 49
Practical Basic Programs (40 ea.)		$ 180	$ 49
Peachtree, Requires CP /M 80 Card,			
GL A/R AP & LAP, all 3		$ 395	$ 239
Perfect, Perfect Writer /Spell 2 pak (CP/M)		$ 399	$ 199
● Quark, Wordcraft, Requires CP/M 80		$ 350	$ 249
Sensible, Sen. Speller or Bookends, ea.		$ 125	$ 85
Sierra /On-Line, Screenwriter Pro, 2 Pak		$ 130	$ 89
Screenwriter II		$ 130	$ 89
Fun Deduction	NEW	$ 130	$ 89
Gen Manager II	NEW	$ 230	$ 155
Homeword		$ 130	$ 89
Handler Pak (Word, List & Spell)		$ 130	$ 85
Software Automatic, Mail Merge (IIe or IIc)		$ 295	$ 179
Software Publishing, PFS: File		$ 125	$ 79
PFS: Report		$ 125	$ 79
PFS: Graph		$ 125	$ 79
PFS: Write (IIe)		$ 125	$ 79
Stoneware, DB Master Version 4.0		$ 350	$ 229
DB Utility Ver II		$ 150	$ 99
Videx, Ultrafun		$ 189	$ 119
VisiCorp, VisiCalc			Call

UTILITY & SYSTEM

	LIST PRICE	OUR PRICE
Beagle, CPIL or Alpha Plot, each	$ 35	$ 27
Ap Mechanic, Beagle Graphics (DOS) ea.	$ 50	$ 39
Double Take or Utility City, each	$ 30	$ 19
Typerfect, for Dos III or DOS Basic, each	$ 70	$ 15
Central Point, Filer DOS 3.3 & Unk	$ 20	$ 15
Copy II Plus, Ver 6.0	$ 40	$ 29
Epson, Graphics Dump	$ 15	$ 9
Hayden, Speed Keys (for Smartmodem)	$ 100	$ 69
● Insoft, GraFORTH II by Paul Lutus	$ 90	$ 65
Microsoft, A.I.D.S.	$ 150	$ 89
Fortran 80	$ 195	$ 135
COMPLETE MACINTOSH LINE IN STOCK		
Penguin, Complete Graphics System II	$ 80	$ 54
Graphics Magician	$ 60	$ 41
Phoenix, Zoom Grafix	$ 40	$ 34
Quality, Bag of Tricks	$ 50	$ 29
Terrapin, Logo	$ 99	$ 65
Unidisk 3/Mt, ADZII Express-The Pro	$ 130	$ 89
Utilico, Essential Data Duplicator IIe	$ 80	$ 49

HOME & EDUCATIONAL

		LIST PRICE	OUR PRICE
Atari, Lanapotte, Pac Man or Donkey K, ea.		$ 35	$ 28
Mr. Pie Man, Jungle Hunt	NEW	$ 35	$ 28
Barrons, Study Program for SAT		$ 90	$ 69
Beagle Bros., Beagle Bag		$ 30	$ 19
Bluechip, Whiteboard		$ 60	$ 40
Brederbund, Print Shop	NEW	$ 60	$ 39
Dropzone or Lode Runner each		$ 35	$ 25
Arcade Pak		$ 70	$ 49
Apple Panic		$ 35	$ 25
CBS, Large Inventory		35% off list	
● Continental, Home Accountant		$ 75	$ 49
Davidson, Alien Rain or Zaxon, each		$ 35	$ 27
Davidson, Speed Reader II		$ 70	$ 47
Word Attack! or Math Master +a		$ 35	$ 27
Edu-Ware, Large Inventory		35% off list	
Hayden, Sargon III (Chess)		$ 50	$ 34
Hayden, Sargon III (Chess)		$ 50	$ 34
Spinnaker, Aerobics or Facemaker, each		$ 35	$ 27
Insoft, Games/Jump/Spider Raid/Grapple		$ 32	$ 25
Koalapad, Koalapad	NEW	$ 129	$ 84
Koala, Full line in stock, Call		35% off list	
Learning Co., Early Learning		35% off list	
Microsoft, Typing Tutor II		$ 25	$ 17
Sharpgreen, Dollars and Sense or S.A.M.		$ 130	$ 89
Origin, Ultima III		$ 60	$ 40
Penguin, Penmouse	NEW	$ 95	$ 69
Scarborough/Lightning, Mastertype		$ 40	$ 27
Sir Tech, Large Inventory		$ 30	$ 25
Sir Tech, Wizardry		$ 50	$ 35
Spinnaker, Full line in stock, CALL		35% off list	
Sub Logic, Flight Simulator II		$ 50	$ 37
Night Mission Pinball		$ 40	$ 22
Terrapin, Logo		$ 99	$ 65

MISCELLANEOUS

	LIST PRICE	OUR PRICE
Electronic Protection, Lemon	$ 60	$ 40
Orange	$ 80	$ 60
Peach	$ 40	$ 30
Orange 65	$ 140	$ 99
Kensington, PC Save ™ Line Cord + filter	$ 50	$ 39
Network II, Wireless + Main surge	$ 70	$ 59

CALCULATORS

HP	41CX, Calculator	$ 325 $ 275
	41C, Calculator	$ 195 $ 149
	41CV, Calculator w /i/O	$ 275 $ 219

PLOTTERS

AMDEK, Amplot II, 6 pen 10 x 14 Bed $1099 $ 899

PRINTER SUPPLIES

Tractor Feed Paper, Ribbons, Daisy Wheels Call

★ MEANS A BEST BUY

DISKETTES

● CONROY-LAPOINTE™ DISKETTES NEW!
We guarantee these top quality products with the Conroy LaPointe super 3 YEAR / UNITED WARRANTY

	LIST PRICE	OUR PRICE
10 ea. SS/SD, 35 Track (Apple, etc.)		$ 17
10 ea. SS/DD, 35 Track (Apple, etc.)		$ 149
1000 ea. SS/DD, 35 Track (Apple, etc.)		$1245
10 ea. SS/DD, 40 track (IBM, H P)		$ 29
100 ea. DS/DD, 40 Track (IBM-PC Pc-formatted)		$ 239
10 ea. DS/DD, 40 Track (IBM-PC Pc-formatted)		$ 39
100 ea. DS/DD, 40 Track (IBM-PC Pc-formatted)		$ 349
1000 ea. DS/DD 40 track (IBM-PC Pc-formatted)		$2495

	LIST PRICE	OUR PRICE
AMDEK, 3" Diskettes, Pkg. 10	$ 60	$ 49
CDC, 10/Box SS/DD, 48" (Apple, IBM)	$ 550	$ 195
10/Box SS/DD, 40" (IBM, H P)	$ 750	$ 195
10/Box DS/DD, 40" (IBM, H P)	$ 750	$ 295
10/Box DS/DD, 48" (IBM, H P)	$ 75	$ 32
DYSAN, 10 ea SS/DD (Apple etc.)	$ 40	$ 27
10 ea DS/DD 48" (IBM etc.)	$ 60	$ 39
MAXELL, 10 each, MD1 SS/DD	$ 55	$ 24
10 each, MD2 DS/DD	$ 75	$ 34
VERBATIM, 10 each, MD515 01 SS/DD	$ 49	$ 27
10 each, MD34 DS/DD	$ 84	$ 32

GENERIK™ DISKETTES

AS LOW AS $1
W /Jackets,
no labels, top quality

NO HASSLE MONEY BACK GUARANTEE ON GENERIK 5

100 ea. SS/SD, 35 track (Apple Ware)	$ 415 $ 130
100 ea. SS/DD, 40 track (IBM, H P)	$4150 $ 195
100 ea. DS/DD, 48TPI (IBM, H P)	$ 626 $ 170
1000 ea. DS/DD, 48TPI (IBM, H P)	$6260 $1400

MODEMS AND ACCESSORIES

	LIST PRICE	OUR PRICE
ANCHOR, Signalman Mark III	$ 399	$ 269
HAYES, 1984 PC Smartmodem 1200/B	$ 700	$ 495
1984 PC Smartcom II Software	$ 149	$ 109
Smartmodem 1200 Internal	$ 329	$ 249
Microcomputer 100 (5 1/4" bus)	$ 399	$ 275
Stack Chronograph (RS-232)	$ 249	$ 179
Stack Smartmodem 300/RS-232	$ 289	$ 225
Stack Smartmodem 1200 /RS-232	$ 699	$ 495
1984 PC to Modem Cable	$ 39	$ 25
HAYES MICROMODEM II/Modem 1200	NEW	$ 595 $ 395
NOVATION, 103/113 Smart Cat	$ 595	$ 415
103/113 J-212 (1200/300 Hayes/Bell)	$ 595	$ 415
Apple Cat II 300 BAUD	$ 389	$ 249
J-Cat for Apple Cat, 1200 BAUD	$ 775	$ 499
Cat	$ 189	$ 139
J-Cat	$ 149	$ 104
J-Cat for Cat	$ 695	$ 579
QUADRAM,		
Quadmodem, Internal 1984	NEW	$ 595 $ 425
Quadmodem, Serial 1984	NEW	$ 695 $ 479
1984 PC to Modem Cable	$ 39	$ 25
HAYES MICROMODEM II/Modem 1200	NEW	$ 595 $ 395
NOVATION, 103/113 Smart Cat	$ 595	$ 415
103/113 J-212 (1200/300 Hayes/Bell)	$ 595	$ 415
Apple Cat II 300 BAUD	$ 389	$ 249
J-Cat for Apple Cat, 1200 BAUD	$ 775	$ 499
Cat	$ 189	$ 139
J-Cat	$ 149	$ 104
J-Cat for Cat	$ 695	$ 579
QUADRAM,		
Quadmodem, Internal 1984	NEW	$ 595 $ 425
Quadmodem, Serial 1984	NEW	$ 695 $ 479

SOFTWARE SEE APPLE OR IBM UTILITY SOFTWARE SECTIONS

MONITORS AND ACCESSORIES

		LIST PRICE	OUR PRICE
AMDEK, 300, 400, 500, 600 700	NEW	Call	
12" Green * MDS		$ 199	$ 149
12" Amber * XGR		$ 199	$ 149
12" Amber, 41/31/8 for IBM-PC		$ 299	$ 249
12" Color I + Composite		$ 399	$ 249
13" Color II RGB Hi Res, IBM# Applet		$ 499	$ 329
11" Color IV RGB, 720H/400V, IBM#		$ 795	$ 649
80MM II Color II or III to Apple II /J?		$ 179	$ 129
PRINCETON, RGB Hi Res, HX 12		$ 795	$ 499
RGB Hi Res, SR 12		$ 995	$ 699
Amber MAX 12 for Mono Board		$ 249	$ 199
QUADRAM, Quadchrome, 12" RGB Color		$ 695	$ 450
Quadscreen 17" 768x512		$1095	$ 595
Quadvision, 12" RGB Color	NEW	$ 450	$ 450
Amberchrome, 12" Amber	NEW	$ 250	$ 145
ZENITH, 12" Green, 7MH123		$ 200	$ 149
12" Amber, 7AM124		$ 200	$ 149
12" Color, 7VM135		$ 599	$ 449

PRINTERS AND ACCESSORIES

	LIST PRICE	OUR PRICE
DOT MATRIX:		
EPSON, LQ1000, 200 & 67 CPS	NEW	$1195 Call
Parallel Interface for LQ1500	NEW	$ 100 Call
RX80, 100 cps		$ 399 Call
RX80, F/T		$ 489 Call
FX80, 160 cps		$ 599 Call
FX100, 160 cps		$ 885 Call
Graftrax + , Graftrax +, Graftrax + Apple II Graphics Dump Program		$ 85 $ 69
TALLY, 1620, 80 col. 160 cps		$ 798 $ 568
1630, 132 col. 160 cps		$ 998 $ 698
OKIDATA, 82A, 80 col. 120 cps, para		$ 349 $ 319
83A, 132 col. 120 cps, para		$ 549 $ 499
84, 136 col. 200 cps, para		$ 1395 $ 1095
92, 80 col. 160 cps, para		$ 599 $ 449
93, 136 col. 160 cps, para		$ 999 $ 695
2350P Pacemark, 350cps, para		$ 2795 $ 1995
2410P Pacemark, 350cps, para		$ 2995 $ 2395
Microline, Plug 'N Play Factory Diagnostic		
ORANGE MICRO, Grappler +, for Apple		$ 165 $ 119
PRACTICAL, Printer Buffer, 16K, para		$ 149 $ 99
Mountbuff In Line 64K Ser		$ 349 $ 259
Mountbuff In Line 64K Par		$ 349 $ 259
QUADRAM, Quadjet, Ink Color Printer		$ 995 $ 795
● STAR MIC., Gemini 10? X, 120 cps		$ 499 $ 289
Gemini 15? X, 120cps		$ 549 $ 439

	LIST PRICE	OUR PRICE
LETTER QUALITY:		
AMDEK, 5040, 40 cps, Para & Ser	$ 1675	$ 1395
DIABLO, 1640, Daisy Wheel, 40 cps, IIe	$ 1795	$ 1395
1/14, same as 1640 with 1/4 2 cut &Prgs	$ 589	$ 439
Multiplan, Plug 'N Play Factory Diagnostic		
● JUKI, 6100, 18cps, Para / Serial	$ 599	$ 450

PRINTER UPGRADES and BUFFERS

IDEAS, Microstuffer	$ 60	$ 35
Rotostuff, Ser & Par for Gemini	$ 95	$ 59
QUADRAM, 48 expansion for 5 1/4 Graphtrax (Graphtrax only)	$ 175	$ 145
Microfazer, + Copy, PP 64K, 4NP/64 + PS	$ 299	$ 229
Microfazer, + Copy, PP 64K, 4NP/64 + PS	$ 299	$ 229
Microfazer, Snap-on, PP, Epson + PS	$ 169	$ 129
Microfazer, Snap-on, 64K, PP, Epson + PS	$ 169	$ 129
Microfazer, Snap-on, 64K, PP, Epson + PS	$ 299	$ 229

CASH & CARRY OUTLETS:

Open this counter sales only. Open Monday through Saturday 10:00 to 6:00

SAN FRANCISCO — NEW STORE! OPENING 5/84. For information, call (415) 561-9050. PORTLAND, OREGON —NEW LOCATION! At Park 217 Square at intersection of I-5 and 99W. Call 620-5595.
SEATTLE, WASH. —3540 128th Ave. SE., Bellevue, WA 98006. In customer's Place near Factoria Square. SE of Hwy 405 & 90 and at 164th & Eastgate. Call 641-4736.

ORDERING INFORMATION AND TERMS: BANK, MC 12060 SW Garden Place, Portland, OR 97223 — Includes telephone number and double check your figures for Shipping, Insurance & Handling
Shipping: Software orders over $100 ship free in the continental U.S. Hardware orders over $100 ship free via UPS Ground. Personal or UPS Shipping: All items subject to availability. Shipping times & charges may vary. Call for current charges. Foreign: Call for shipping information and handling.
Insurance: Free insurance on all orders shipped UPS Ground. Optional insurance for Parcel Post, UPS Blue & UPS Air. Insurance rates: $0-$50 $1.50; $50.01-$100 $2.00; $100.01-$150 $2.50; $150.01-$200 $3.00; $200.01-$250 $3.50; $250.01-$300 $4.00; $300.01-$350 $4.50; $350.01-$400 $5.00; $400.01-$450 $5.50; $450.01-$500 $6.00; $500.01-$550 $6.50; $550.01-$600 $7.00; $600.01-$650 $7.50; $650.01-$700 $8.00; $700.01-$750 $8.50; $750.01-$800 $9.00; $800.01-$850 $9.50; $850.01-$900 $10.00; $900.01-$950 $10.50; $950.01-$1000 $11.00; $1000.01-$1050

-LA POINTE

Formerly **Computer Exchange**

DEALERS WE BUY EXCESS INVENTORIES

LOW PRICES TO PROFESSIONALS WHO KNOW WHAT THEY WANT AND KNOW HOW TO USE IT!

© 1984 by Conroy LaPointe, Inc.
All Rights Reserved

256K IBM-PC or XT

360K Disk Drives by CDC
90 Day Limited Warranty By Us
Call for Details

© 1983 Conroy LaPointe, Inc.

SUPPLY CENTER for IBM-PC or XT

		LIST	OUR
AMDEK	MM 4-in-1 Multi-Mode Board/Clock	$ 349	$ 299
AST	Graphics/Address, Para Port	$ 499	$ 399
	Combo/Par. Products		Call
	Mega/Plus Products		Call
	Six/Pak/Plus, 64K, S/P/C+S/W	$ 395	$ 295
	Six/Pak/Plus, 256K, S/P/C+S/W	$ 695	$ 495
	Six/Pak/Plus, 384K, S/P/C+S/W	$ 495	$ 395
	Game Port for Six/Pak	$ 50	$ 39
	I/O Plus II, S/P/C/G	$ 215	$ 150
	I/O Plus II, S/P/C/G	$ 265	$ 185
	I/O Plus II, 2S/2C/G	$ 315	$ 215
	Mono/Grph/Plus/PRC/Clock/Hard	$ 495	$ 375
	PDisk, Starter Kit, PC/XT/Clock		$ 1099
	PCNet, Circuit Board, PC/XT		$ 795
***CCS**	System 132 col. mono board	$ 799	$ 495
	Graphics Adapter for Supervision	$ 250	$ 99
Chalkboard	Power Pak/Requires Kit	$ 100	$ 73
	Chalkboard Starter Kit	$ 50	$ 34
***ComX**	EconoRAM™ 256K RAM Card w Realtime Clock		
	emulator and spooler software	$ 495	$ 325
CURTIS	UNI-Monitor kit & owned base	$ 50	$ 39
	9 to 9 feet keyboard cable	$ 40	$ 35
	Vertical CPU "System Stand"	$ 25	$ 19
	Mono/Inverse Ed. Color Pair	$ 40	$ 35
HAUPPAGE (HCW)	80B / Chip	NEW	$ 175
	80B / Kit	NEW	$ 125
	80B / Software Pak	NEW	$ 180
	80B / Micro Pak	NEW	$ 245
HERCULES	Color Card w/para.	$ 245	$ 169
	Graphics Card Mono	$ 499	$ 349
Key Tronic	KB5150, 3d keyboard	$ 209	$ 159
	KB5151, 3d keyboard	NEW	$ 229
	KB5161 w keyboard	NEW	$ 255
Koala	Koala Pad™ w/PC Design	$ 99	$ 79
	Programmer's Guide	$ 15	$ 14
MAYNARD	MultiFunction I/O Card MFC	$ 99	$ 79
	Memory Card no RAM	$ 119	$ 109
SANDSTROM SERIES	Memory Card 256K	$ 349	$ 289
	HardDisk I/F Module (HDMI)	$ 499	$ 399
	HardDisk Cable	$ 30	$ 27
	Para Port Module (PPM)	$ 59	$ 49
	Serial Port Module (SPM)	$ 59	$ 49
	Clock Cal Module (CCM)	$ 55	$ 45
	Game Adapter Module (GPM)	$ 55	$ 43
	Memory Module "0"K (MMK)	$ 122	$ 89
	Memory Module 256K (MM/56)	$ 452	$ 357
Titan	Accelerator PC (8086 + 12Mhz)	$ 995	$ 754
TG PRODUCTS	Joystick	$ 45	$ 34

- **Maynard,** XT I/O meg Hard Disk & I/F W$1 — $1295 — $1150
- **MICROSOFT** SystemCard 256K — $ 625 — $ 450
  - Mouse/Bus — $ 195 — $ 145
  - **MOUSE SYSTEMS/PC** Mouse w/Software — $ 295 — $ 195
  - PC w/ Reader with Mouse — NEW — $ 395
- ***MAGNUM***, PC MasterCard™, 1.536K, Multifunction S/P/C/G/C with SunRAM™ software which provides printer spooler RAM disk & many other functions — $ 499 — $ 395
- **PLANTRONICS** Color Board & Colormagic, Hi color w/Para — $ 550 — $ 395
  - Colormagic Board & Software, Hi color w/o Para — $ 350 — $ 295
- **PARADISE** Multi-Display Card — NEW — $ 595 — $ 435
- **QUADRAM**
  - ★ Quadlink — NEW SET VERSION — $ 680 — $ 480
  - Quadboard, no RAM, expand to 384K — $ 295 — $ 215
  - Quadboard 64K, expand to 384K, S/P/C/C — $ 395 — $ 295
  - Quadboard 256K, expand to 384K, S/P/C/C — $ 675 — $ 525
  - Quadboard 64K, S/P/C/C — $ 795 — $ 629
  - Quadboard II, no RAM, expand to 256K — $ 295 — $ 215
  - Quadboard II, 64K, expand to 256K, 2S/2C — $ 395 — $ 269
  - Quadboard II, 256K, 2S/2C — $ 595 — $ 399
  - Quad 512 + 64K plus serial port — $ 325 — $ 249
  - Quad 512 + 256K plus serial port — $ 550 — $ 420
  - Quad 512 + 512K plus serial port — $ 895 — $ 629
  - Quadclock II, Board, 16 colors — $ 295 — $ 215
  - Upgrade Quadclock II to II kit — $ 275 — $ 199
  - Quadkeyt board, Mono-S/P/C/C — Call
  - Quadchrome, LP/RGB, Color Monitor — $ 795 — $ 495
  - Quadchrome II, 14" RGB Color — $ 650 — $ 450
  - Quadchrome, 12" Amber — $ 495 — $ 349
  - Quad 3278 — NEW — $ 1195
  - Quadmet — NEW — Call
  - Quadtest III — NEW — Call
- **Tecmar** Graphics Master — $ 695 — $ 545
  - 1st MATE, 64K, S/P/C/C — $ 389 — $ 275
  - 1st MATE, 256K, S/P/C/C — $ 595 — $ 395
  - Captain, 64K, S/P/C/C — $ 424 — $ 324
  - Captain, 384K, S/P/C/C — $ 795 — $ 595
  - Wiest, 256K (short board) — $ 499 — $ 369
  - Wiest, 384K, S/P/C/C (Chart bd.) — $ 695 — $ 529
  - Accelerator PC (8086 + 12Mhz) — $ 995 — $ 754
- **TG PRODUCTS**, Joystick — $ 45 — $ 34

© 1983 Conroy-LaPointe, Inc.

Prices and availability subject to change. Call

★ Chip **$49** Call for Larger Quantity Prices
9 Each, 64K, 200 ns. MEMORY CHIP KIT
90 Day Warranty by us

$325 $295 Two or more

ComX **EconoRAM™ 256K BOARD**
With Fastrak™ RAM Disk Emulator and Spooler Software
Fully Compatible, 1 Year Limited Warranty by ComX
Works on DOS 1.1, 2.0 or 2.1

★ **MEANS A BEST BUY**

for the Gold-PC or XT **ALLOY** **DRIVES** AND ACCESSORIES

	LIST	OUR PRICE
PC Backup, 10MB Cartridge Tape System	$2195	Call
PC STOR 41MB (1 Mil Disk) Backup System	$3995	Call

AMDEK

Amdek V, 1 height, internal, 320/360K	$ 379	$ 249
Amdek W, 1" Dual Floppies, 360K	$ 499	$ 439

CDC 5.25 Dual Drive Installation Kit — $ 30 — $ 16
MAYNARD Floppy Controller (w/Para.) — $ 100 — $ 239

QUARAM Quadchild Internal Hard Disk w/ Controller

6MB Removable	NEW	$2795	$1895
6MB Fixed	NEW	$1595	$1495
12MB Fixed	NEW	$2250	$1650
19MB Fixed	NEW	$2695	$2195
32MB Fixed	NEW	$6500	$4795

10 MEG (XT) DISK KITS

Convert your PC to 10 meg and to 8+ tri compatible with one of the following: INTERNAL HARD DISK SYSTEMS. Kits are quality engineered to work with DOS 2.0/1.1 Compatibility !!! compatible. All you need is your DOS manual. Easy to install. Includes 10 Megabyte Hard Disk, Controller Card and Instructions.

ComX Internal 10 meg Hard Disk Kit — NEW — $ 865

Kamerman Labs Megaflight 10D, 10 mbyte Hard Disk Kit — NEW — $ 869

MAYNARD
10 meg Hard Disk Kit, WS1 Sandstar Controller will accept 3 Sandstar modules — $1395 — $1150

OVERSTOCK SPECIALS

IBM HARDWARE

CCS, Supervision, 132 Col. Mono Bd	$	799	$ 399
CCS, Graphics Adapter for Supervision	$	250	$ 99
KENSINGTON, PC Saver	$	50	$ 35
KOALA, Koala Pad w/PC Design	$	99	$ 79
Quadram, 256K Quadboard w/ 2S/2C Max	$	595	$ 395

IBM SOFTWARE

ASHTON-TATE, dBase II	$	495	$ 269
DIGITAL RESEARCH, Managers (PC-DOS)	$	275	$ 175
DIGITAL RESEARCH, Full Line			Call
FOX & GELLER, PC-DOS/MS	$	795	$ 185
HOWARD SOFT, 84 Tax Preparer	$	250	$ 145
MICROPRO, Option Pak MM/SS/SI	$	295	$ 145
MICROPRO, Option Pak WM/SS/SI	$	295	$ 145
MICROPRO, Option Pak WM/DS/DI	$	395	$ 195
MICROPRO, Option Pak WM/DS/SI	$	395	$ 195
MICROPRO, Option Pak WM/SS/DI	$	395	$ 195
MICROPRO, WordStar	$	495	$ 295
MICROPRO, WordStar Professional 4 Pak	SPECIAL	$	695 $ 395
MICROPRO, CorrectStar™ (requires 192K)	SPECIAL	$	395 $ 195
MultiMerge™		$	250 $ 129
Starindex™		$	250 $ 129
ProSpell, SS/MM/SI	SPECIAL	$	495 $ 195
InfoStar™	SPECIAL	$	495 $ 295

SOFTWARE for IBM-PC or XT

BUSINESS & TRAINING

APPLIED SOFT TECH. Versaform	$ 349	$ 265
ARKTRONICS, Sorel	$ 195	$ 149
ASHTON-TATE, Friday	$ 295	$ 199
Framework (retail July/Aug)	NEW	$ 695
dBase III (retail July/Aug)	NEW	$ 695
dBase III (req. PC-DOS & 128K)		$ 495
dBase II to III upgrade	$ 200	$ 119
dBase III Library Module (Book)	$ 70	$ 49
Everyman's DB Primer (Book)	$ 15	$ 12
ATI, Time and Billing System—Wide time or work	$ 350	$ 249
BRODERBUND, Bank Street Writer	$ 80	$ 56
BPI, GenCAL/ACALA/GLARAP per PC	$ 495	$ 345
BUSINESS SOLUTIONS, Jack 2	NEW	$ 495
CDEX, Electronic Cash (inventory)	$ 195	$ 149
CHANG LABS, Micro Plan	$ 495	$ 335
CONTINENTAL, Home Advantage	$ 70	$ 49
Home Accountant Plus	$ 150	$ 99
IT'M (Time Keeping, Mailing)	$ 125	$ 79
Property Management	$ 495	$ 329
DOW JONES, Market Analyzer	$ 350	$ 225
Market Manager	$ 150	$ 99
Market Microscope	$ 349	$ 249
FOX & GELLER,		
QuickSort/Word, Word Processor	$ 295	$ 195
dTom (MODOS or CP/M86, each)	$ 195	$ 149
Project Manager	NEW	$ 395
HAYDEN, IBM Pac Writer,	NEW	$ 265
Pac Speller or Sargon III each	$ 50	$ 34
HOWARDSOFT,		
Tax Preparer 1984—Apr 1983 year	$ 295	$ 220
HUMAN EDGE, Management Aids, set 1	$ 195	$ 149
IUS, Easy Writer II System	$ 350	$ 259
EasySpeller II	$ 150	$ 109
CP/M-86 Pak w/MP	$ 495	$ 395
GLARAP OR or WM each	$ 495	$ 395
*** INSOFT**, Data Design (easy to use DBMS)	$ 250	$ 95
Graf-Pak (formatted 3D graphics)	$ 250	$ 95
KENOWARE, Accounts (req. graphics)	NEW	$ 64
LIFEBOAT, Lattice C	$ 395	$ 249
LIFETREE, Wordcenter 1/2	$ 195	$ 130
Wordcenter Deluxe	$ 295	$ 195
*** LOTUS**, 1-2-3	$ 495	$ 349
Symphony (avail July/Aug)	NEW	$ 695
Jazz (for Macintosh avail July/Aug)	NEW	$ 295
QUE, Word Proc. (Software Book)	$ 200	$ 135
UNIVERSITY VENTURES, Think tank	$ 195	$ 129
MICROPRO, WordStar™	$ 495	$ 295
WordStar Professional 4 Pak	SPECIAL	$ 695 $ 395
CorrectStar™ (requires 192K)	SPECIAL	$ 395 $ 195
MailMerge™		$ 250 $ 129
Starindex™		$ 250 $ 129
ProSpell, SS/MM/SI	SPECIAL	$ 495 $ 195
InfoStar™	SPECIAL	$ 495 $ 295

BUSINESS & TRAINING

*** MICRONIM**, R'Base, Series, 4000	$ 495	$ 299
Compiler, Report Writer	NEW	$ 150
R'Base Cloud	NEW	$ 175
MICROSOFT, Fortran	NEW	$ 175
Pfinance	NEW	$ 125
Multiplan	$ 195	$ 129
Chart	$ 195	$ 129
Word with Mouse	$ 475	$ 325
MONOGRAM, Dollars & Sense	$ 165	$ 110
MULTIMATE, Multimate	$ 495	$ 295
NORTON, Utilities for PC each	NEW	$ 495
OPEN SYS, GLARAP/PLAN or BPI/CAL	$ 695	$ 425
PEACHTREE, Basic Book 1, Business, Statistics & Math Programs on DS/DD Diskette	$ 100	$ 69
Basic Business Basic Programs (10 ea.)	$ 100	$ 69
Practical Basic Programs (40 each)	$ 100	$ 69
PEACHTREE, Punch Pak (G/L,AR/AP)	$ 295	$ 195
Punch Pak (Inventory)	$ 195	$ 129
Punch Pak (Order Entry, Retail)	$ 195	$ 129
Punch Pak (Payroll, Point of Sale)	$ 195	$ 129
Punch Pak (Time, Fin. Calc. each)	$ 195	$ 129
Perfect Writer, Fin. Calc. (4)	$ 699	$ 499
PERFECT, Perfect Writer™	$ 349	$ 249
Writer & Speller 2 Pak	$ 399	$ 249
Perfect Calc, Perfect Filer, each	$ 249	$ 149
Perfect Writer, Speller, Fin. Calc. (4)	$ 699	$ 499
SOFTWARE PUBLISHING, PFS:File	$ 140	$ 89
PFS:Report	$ 175	$ 79
PFS:Write	$ 175	$ 79
PFS:Graph	$ 140	$ 89
SORCIM, SuperCalc 2	$ 295	$ 195
SuperCard 3	$ 295	$ 265
SSI/SATSUMA, WordPerfect	$ 495	$ 275
Personal WordPerfect	$ 195	$ 149
STONEWARE, Advanced DB Master	$ 595	$ 395
SUMMA, Trader's Forecast	NEW	$ 250
Trader's Data Manager	NEW	$ 250
Trader's Accountant	NEW	$ 250
Trader's Toolkit	NEW	$ 700
T/MAKER, T Maker III	$ 275	$ 149
TURNKEY SYSTEMS, Mgt. Series	$ 395	$ 295
VISICORP, VisiCalc 4	$ 250	$ 169
Call Lee to Speak		

UTILITY & SYSTEM

1983 CL SOFTWARE AWARD:
"Copy II PC by Central Point Software is still one of the best software packages available. It will copy most copy protected software and faster than any other backup system. Unlike other copiers it makes an exact duplicate of your original and it does 100% verification of copy. Documentation is excellent."

CENTRAL POINT, Copy II PC Backup	$ 40	$ 30
*** COMX**, Fastrak™ RAM Disk emulator and printer spooler program. Works on any PC/DOS version or RAMCard Menu Driven	$ 100	$ 59

UTILITY & SYSTEM

DIGITAL RESEARCH

Concurrent CP/M 86™ w/ windows	$ 350	$ 225
CP/M 80™ (CP/M)	$ 60	$ 40
CBASIC 86™ (CP/M86)	$ 200	$ 135
CBASIC Compiler (CP/M 86 or PCDOS, ea	$ 300	$ 365
Pascal/MT+ (CP/M 86)	$ 400	$ 269
Pascal/MT+ (CP/M 80)	$ 300	$ 199
PL/I (PCDOS or CP/M 86, each)	$ 750	$ 499
Speed Pro Plus (CP/M 86)	$ 350	$ 235
DR LOGO 86 CP/M86)	$ 100	$ 69
FUNK, Sidekick, Softwaves	NEW	$ 49
HAYES, Smartcom II (Data Com)	$ 149	$ 109
INSOFT, Grafi-Pak (Hi-resolution) 3D graphs	$ 250	$ 95
MICROSTUF, Crosstalk XVI(Data Com)	$ 195	$ 129
MICROSOFT, Multi-Mate/Word	$ 395	$ 295
Business BASIC Compiler	$ 600	$ 399
Pascal Compiler	$ 400	$ 269
C Compiler	$ 500	$ 329
Quick Compiler	$ 195	$ 129
FORTRAN Compiler	$ 350	$ 250
Cobol Compiler	$ 700	$ 495
NORTON, Utilities 2 Q, 14 programs	$ 80	$ 54
ROSESOFT, Protect	$ 70	$ 49

HOME & EDUCATIONAL

ATARI, Centipede Pac-Man or Donkey each	$ 35	$ 28
EPYX/Audio Sim., Temple of Apshai	$ 40	$ 29
ARMONK, The Lemon Sorte	$ 40	$ 29
BLUE CHIP, Millionaire or Tycoon each	$ 60	$ 39
BPI SYSTEMS, Personal Accounting	$ 70	$ 49
*** BRODERBUND**, Apple Panic (Color)	$ 30	$ 19
Lode Runner or Serpentine each	$ 35	$ 25
CBS, Chin Golden Learn Bridge	$ 80	$ 54
COMPREHEN., PC Cadet (1 or 2 Q ea.)	$ 80	$ 54
CONTINENTAL, Home Accountant Plus	$ 150	$ 89
DAVIDSON, The Speed Reader II	$ 70	$ 49
Word Attack or MathMaster each	$ 50	$ 34
HAYDEN, Dollars & Sense II	$ 195	$ 149
INFOCOM, Deadline or Suspended, each	$ 50	$ 34
Zork I or Zork II or Zork III each	$ 40	$ 29
*** INSOFT**, Wayne Wardrobe or Quote-a-matic	$ 35	$ 25
*** MICROPRO**, Calc Star or Spell Star II	$ 70	$ 49
MONOGRAM, Dollars & Sense	$ 165	$ 110
ORIGIN, Ultima III	$ 60	$ 39
PBI, CORP. Personnel Investor	$ 145	$ 99
SARGON, Chess 2.5 or 3.0 each	$ 50	$ 34
SPINNAKER, Snooper Troops (1 or 2)	$ 45	$ 35
Story Machine or Trains each	$ 35	$ 25
STRATEGIC, The Warp Factor	$ 40	$ 30
SUBLOGIC, Night Mission Pinball	$ 40	$ 27

FREE GIFT

Use of our order forms qualifies you for a free gift with your order. Call on our mailing list now for order forms, and our new newsletter and sales specials announcement. Our

OUR AD #C9 COUPON

Mail To: 12060 SW Garden Place, Portland, OR 97223

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

OUR AD # C9

MEMBER COMPUTER DEALERS ASSOCIATION

VISA MasterCard

NO SALES TAX

National Order Desk **TOLL FREE (800) 547-1289** OREGON ONLY (800) 451-5151 Foreign & Portland (503) 644-2686

HOT LINE (503) 644-5644 Technical Questions

ORDER DESK HOURS 8:30AM to 5PM PST Monday-Friday 10AM to 3PM PST Saturday (Closed Sunday) UPS BLUE LABEL SHIPMENTS: Mon.-Fri. 8AM to 4PM PST

learning problems, and therefore will lead to frustration. This fear may be based on misconceptions about the difficulties of using computers or it may stem from experiences with poorly designed software.

Most children, even those with learning difficulties, quickly become comfortable with computers. Some children in our project took only one practice session to learn to operate the computer. These students were then able to serve as tutors for the others.

All the children mastered the procedures for using the computer in a few sessions. They were not at all intimidated by the computer and were quite willing to experiment, pressing different keys to see what could happen. The children seldom encountered problems in operating the computer. When a problem did occur, they re-entered answers, pressed RETURN, repeated LOAD or RUN commands, and so on—they did not become frustrated or give up.

An important factor in the success of our project was that the software was easy for children to use. The difficulty of the drills could be adjusted to an appropriate level for each child. The computer prompted the children at each step and the procedures were simple and consistent. The program waited for the children to signal that they were ready, and it provided feedback that they could understand easily.

Computers Don't Wear Out

Educators and parents also express concern that since special education students often produce messy work, wear out their books, and break crayons and pencils, they are likely to damage computers. A closer look at the type of wear and tear in these classrooms did not show evidence of any deliberate abuse, but rather the results of problems common among special education students. Many of these children have difficulty with the fine motor coordination required to fold papers, draw within lines, write legibly, and erase mistakes neatly. Consequently, one of the best liked features of the computer was that it did not require any of these skills and did not break, tear, or wrinkle.

Even when children had to "hunt and peck" to enter answers, they found it much easier to type than to write with a pen or pencil. For these children, pressing a key to delete an answer meant that they were able to erase a mistake "without making a hole in the screen."

Computers Encourage Social Interaction

Another negative argument is based on the view that special education students are withdrawn or socially isolated children who need to be encouraged to initiate interactions. Our experience leads us to believe that this is not the case. Most of the children we worked with demanded a great deal of attention, particularly from the teachers. The amount of time they spent seeking directions and approval from the teacher had been both annoying for the teacher and disrupting for the class as a whole.

While working on the computer, the children were kept busy entering answers, changing mistakes, or moving on to the next part of the lesson. They received frequent and immediate feedback about their answers and continued working on each word until they spelled it correctly. They participated more actively in learning than they did in most of their other lessons.

The computer project had dramatic effects upon the children's self-esteem and upon how they were regarded by the other children, teachers, and their parents.

Using the computer allowed the students to be more independent with their work. The teachers felt that this reduced the competition between students for their attention and improved the overall quality of teacher-student interactions.

An important feature of the lesson program was that it responded immediately to incorrect answers. Feelings of failure were lessened since the children did not accumulate a collection of errors before receiving feedback (as usually happens when working paper and pencil lessons that the teacher later checks).

The program also required the students to type each word correctly before going on to the next one. Rather than cause frustration, this practice helped the children avoid making the same mistake repeatedly—a frequent problem for these students. The teachers felt that their students were better able to tolerate failures and showed more patience when working their lessons on the computer. Many times when they had trouble with one of their other lessons, the children asked to be allowed to "work it on the computer."

The computer project had dramatic effects upon the children's self-esteem and upon how they were regarded by the other children, teachers, and their parents. The children came to see themselves as more capable because they were able to operate a "real adult computer." They became more confident and willing to take on challenges, and were less easily frustrated. The teachers began to expect the children to be capable of mastering more difficult lessons.

For the first time, other children in the school (who did not have computers in their classes) were envious of the special education children. The children's parents were interested in the project and expressed pride in their children's ability to use the computer. The number of parents who came to the school on parent-teacher meeting nights increased dramatically.

Computers Help Teachers

Many teachers are concerned that introducing a computer to their classroom would be a drain upon their time and resources. The time devoted to learning how to use the computer and implementing it in the classroom is less than many teachers expect. The rewards can be well worth the time and effort.

In the classrooms participating in our project, the teachers quickly learned to use the computer. The use of peer-tutors to help other children was efficient for the teachers and contributed to positive interactions among the children. It also led to students helping each other with computer problems that occurred later.

After a schedule was developed, the children took their computer turns without teacher supervision. The teachers found the computer could replace them as monitors and drill-practice technicians, and thereby allowed them to devote more time and effort to teaching.

Summary

After the ten weeks with computers in their classrooms, the teachers summarized their views as follows:

"In addition to the fun, the children enjoyed improved communication skills, an increased ability to handle frustration, an opportunity to progress in academic areas, and a growing independence within their learning environments. The success that the children experienced at the computer enhanced their self-esteem. Communications between parent and child, teacher and child, and teacher and teacher improved. All of these aspects helped establish a happy, friendly, and positive climate within the classroom."

We have not discussed the details of the software and other aspects of our project, since we believe comparable effects could be obtained with many different applications of computers in special education. However, using computers does not automatically lead to such benefits.

EDUCATION

We regard three general factors as critical to the successful introduction of computers into any classroom, and we believe that these factors are even more important for special education classes. First, the computer learning experiences must be integrated into the overall program of instruction. That is, the computer must be treated as a tool for learning, not as a toy for playing games. Second, the teachers and children must

The computer must be treated as a tool for learning, not as a toy for playing games.

be given sufficient training in how to operate the computer to become comfortable with it. Third, the software must be well designed and easy to use.

Positive Arguments

After using computers with special education students, we are convinced that the arguments against doing so are invalid. With good software and proper implementation, computers can have very positive effects. We propose the following five arguments in favor of using computers in special education:

Positive Argument #1: Computers can individualize instruction. They can be programmed to present lessons or drills at a level of difficulty and speed appropriate for each child. They can provide immediate and informative feedback, which is particularly helpful for children with learning problems.

Positive Argument #2: Computers can help special education children become active learners. As they learn to control and interact with the computer, their work habits and study skills improve.

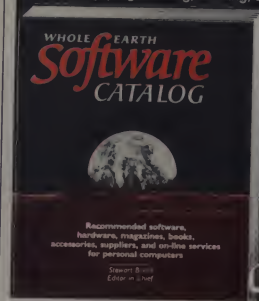
Positive Argument #3: Improved learning skills lead to remarkable changes in children's self-esteem. They have a chance to see learning as fun and easy, and to see themselves as capable and in control. Their expectations for success in other school activities also improve.

Positive Argument #4: As the special education students become more capable and confident, other children, teachers, and parents begin to change their attitudes about these students' abilities.

Positive Argument #5: Special education teachers find their jobs more rewarding as they spend less time keeping records, coaxing and monitoring students, and more time actually teaching. ■

400 programs with Whole Earth connections!

After reviewing thousands of software packages, Stewart Brand and the editors of *Whole Earth Software Catalog* have chosen some 400 as the most useful and usable—for playing, writing, analyzing, organizing, accounting, managing, drawing, telecommunicating, programming, learning, etc. They also evaluate hardware, books, accessories and much more. With the same candor and personal viewpoint that made earlier Whole Earth Catalogs so helpful, this indispensable new guide compares, contrasts, and (by emphasizing those products which work best with one another) *connects*.



With 2 color text and illus. throughout. 32 pp. in full color. $17.50 at bookstores now

QUANTUM PRESS/DOUBLEDAY

CIRCLE 132 ON READER SERVICE CARD

Teach the children well...

CES SHOWCASE AWARD WINNER

THAT'S MY STORY brings creative writing into your home. Your whole family will want to work together to build creative adventures as varied as your imaginations. **$59.95**
- Includes two disks and User's Guide.
- Apple II Series, IBM PC, PCjr.

VOCABULARY CHALLENGE

NEW Build a powerful vocabulary that sticks!

3000 words in 4 challenging games for ages seven to adult. Designed to help users associate words with their meanings. Special Editor lets you add words—Perfect for test review. **$39.95**
- Apple II Series.
- Includes disk and User's Guide.

To order or receive complete FREE catalog call 1-800-645-6564 1-516-621-1540

Satisfaction Guaranteed

LEARNING WELL™
Leaders in Educational Software

CIRCLE 156 ON READER SERVICE CARD

TDK

THE NO-RISK DISK ON SALE

LIFETIME WARRANTY

Box of ten 5¼" TDK diskettes, with labels, envelopes and reinforced hub-rings.

SS/DD	DS/DD
Soft or 16 Sector **$17.50**	Soft or 16 Sector **$21.50**

We offer: Quality, Fast Service & Low Prices

SS/QD 96TPI	DS/QD 96TPI
$26.50	**$32.50**

Buy now and save.

Box of 10 NEW 3½" only **$39.50**

Satisfaction Guaranteed or your Money Back

RIBBONS ON SALE

Prowriter (min of 6)	$4.95 each
Epson MX70 & MX80 cartridge (min of 6)	$4.95 each
Epson MX 100 cartridge (min of 6)	$7.95 each

Shipping & Handling: $3.00 for any order of diskettes or ribbons; C.O.D. orders add $1.65. We accept Visa, Mastercard and American Express credit cards at no extra charge. Illinois residents please add 7% tax.

Call us now toll free ANYWHERE in the U.S.
Orders only: 1-800-227-3800 Ask for "Smart Data"
7 Days a Week, 24 Hours a Day.

Other Information: (312) 256-4456
9am to 8pm (central), Mon. through Sat.

SMART DATA INC.
PO Box 297
Wheaton, IL 60187
(312) 256-4456

CIRCLE 185 ON READER SERVICE CARD

Is There a Wufflegump in Your House?

Creative Computing talks educational software with four top developers.

The amount of educational software on the shelves has multiplied so rapidly in the past few years that winnowing the good educational software from the mountain of chaff can be a harrowing task. For guidelines in choosing educational software, *Creative Computing* asked four leading educational software developers what they think educational software should do and what the future holds.

Joyce Hakansson

"Learning is the most enjoyable thing I can imagine for children," says Joyce Hakansson, who started her own educational software development firm two years ago in a renovated Victorian house in Berkeley, CA. Since then, the Joyce Hakansson Associates (JHA) team of programmers, educators, musicians, artists, writers, and children has produced 19 educational games distributed by four publishers.

Hakansson designed the Computer Gallery at Sesame Place, a theme park in Pennsylvania, from 1979-81 at the request of the Children's Television Workshop, the originators of "Sesame Street." She began her career in educational software in 1973 when she looked for a more intuitive way to convey math principles to her own young children. She and a parent volunteer started a computer lab in conjunction with the Lawrence Hall of Science at the University of California at Berkeley. The next year, she directed their Computer Education Project, which has taught 30,000 to 40,000 people each year to use computers.

She believes that educational software should be entertaining, an enhancement of the learning process. "Children need positive educational experiences to feel confident with a self-learning tool like a computer. So we put a lot of play, laughter—the theater—into our software. Software should be one more tool in children's lives. But we try not to take it totally seriously."

She acknowledges that "the computer has become an artifact of our culture. But computers do not make kids smarter. Computers can enhance children's self images, their feelings about themselves.

Sherrie Van Tyle

But we shouldn't be slavishly tied to the technology."

Space shoot-'em-ups reward aggressive behavior, she says; the player who shoots down the most planes, who is the most aggressive, is the most heavily rewarded. JHA programs, on the other hand, aim to create an environment of learning and play, in which the child is in control rather

Computers do not make kids smarter.

than in the path of an errant missile.

For example, in *Alf in the Color Cave*, the child controls the joystick and fire button to animate shapes and to make sounds. She calls it a "video busy box." The child manuevers Alf through tunnels, and, if successful, moves through all three screens to the end, where a magic color change occurs. But the game is programmed so that each screen is fun to do in itself. Alf meets an obstacle, a Wufflegump, while on his journey, but she emphasizes "there is no sense of harm, damage, or destruction. He is never scared or running away."

Joyce Hakansson

Children need different skills today to prepare them for the world, she points out. The mountain of information means that rote learning is less important than in the past; knowing how to find and use facts, however, has become vital. "Creativity, confidence, acceptance, and adaptability to change, to new contexts are even more important these days."

Instead of writing programs with exercises that have only one correct answer, "JHA creates learning environments. There is no one right way to do it. Children are encouraged to try things, to find that there are many ways to solve a problem. Rather than trying to find concrete answers, the problems usually are open-ended."

She notes that the computer is good at performing repetitive tasks such as computation. Of course, the child still needs to learn the relations between the numbers to evaluate the results.

Some traditional educational tasks are accomplished better without the computer, she points out. For example, in math, learning volume and weights is easier in three dimensions than on the computer. Free drawing is better with crayons and paper; and as yet the fine lines of book illustrations haven't been duplicated by computer graphics. Workbooks and flashcards remain valuable.

As for the future of educational software, "we're going into a time that is very unsettled...I have no crystal ball." For high school students and adults, however, she foresees increasing access to large libraries of information by computer.

JHA's goal is "low threshold" software. "The software is the child's window to the machine; it should be as natural, as intuitive, as barrier-free as possible."

She gives an example: "When you look at a shovel, you know what to do with it—it looks like something you dig with. It is part of our culture. As software producers, we need to use some of the metaphors of our culture as touchstones. Even if the terminology is not exact by engineering standards, software should be natural, friendly, and familiar." Thus, in one JHA program, the instruction "delete"

Learn robotics and industrial control as you build this robot

New NRI home training prepares you for a rewarding career in America's newest high-technology field.

The wave of the future is here. Already, advanced robotic systems are producing everything from precision electronic circuits to automobiles and giant locomotives. By 1990, over 100,000 "smart" robots will be in use.

Over 25,000 New Jobs

Keeping this robot army running calls for well-trained technicians . . . people who understand advanced systems and controls. By the end of the decade, conservative estimates call for more than 25,000 new technical jobs. These are the kind of careers that pay $25,000 to $35,000 a year right now. And as demand continues to grow, salaries have no place to go but up!

Build Your Own Robot As You Train at Home

Now, you can train for an exciting, rewarding career in robotics and industrial control right at home in your spare time. NRI, with 70 years of experience in technology training, offers a new world of opportunity in one of the most fascinating growth fields since the computer.

You need no experience, no special education. NRI starts you at the beginning, takes you in easy-to-follow, bite-size lessons from basic electronics right on through key subjects like instrumentation, digital and computer controls, servomotors and feedback systems, fluidics, lasers, and optoelectronics. And it's all reinforced with practical, hands-on experience to give you a priceless confidence as you build a programmable, mobile robot.

Program Arm and Body Movement, Even Speech

Designed expecially for training, your robot duplicates all the key elements of industrial robotics. You learn to operate, program, service, and troubleshoot using the same techniques you'll use in the field. It's on-the-job training at home!

Building this exciting robot will take you beyond the state of the art into the next generation of industrial robotics.

You'll learn how your completely self-powered robot interacts with its environment to sense light, sound, and motion. You program it to travel over a set course, avoid obstacles using its sonar ranging capability. Program in complex arm and body movements using its special teaching pendant. Build a wireless remote control device demonstrating independent robot control in hazardous environments. You'll even learn to synthesize speech using the top-mounted hexadecimal keyboard.

You get and keep Hero 1 robot with gripper arm and speech synthesizer, NRI Discovery Lab for electronic experimentation, professional multimeter with 3½-digit LCD readout, 51 fast-track training lessons.

Training to Build a Career On

NRI training uniquely incorporates hands-on building experience to reinforce your learning on a real-world basis. You get professional instruments, including a digital multimeter you'll use in experiments and demonstrations, use later in your work. And you get the exclusive NRI Discovery Lab®, where you examine and prove out theory from basic electrical concepts to the most advanced solid-state digital electronics and microprocessor technology. Devised by an experienced team of engineers and educators, your experiments, demonstrations, and equipment are carefully integrated with 51 clear and concise lessons to give you complete confidence as you progress. Step-by-step, NRI takes you from the beginning, through today, and into an amazing tomorrow.

Send for Free Catalog Now

Send for NRI's big free catalog describing Robotics and Industrial Control plus over a dozen other high-technology courses. You'll see all the equipment you get in detail, get complete descriptions of every lesson, find out more about career opportunities for trained technicians. There's no cost or obligation, so send today. If coupon has been removed, write: NRI, 3939 Wisconsin Ave., Washington, D.C. 20016

NRI SCHOOLS
McGraw-Hill Continuing Education Center
3939 Wisconsin Ave.
Washington, DC 20016

All career courses approved under G.I. Bill
☐ Check for facts

CHECK ONE FREE CATALOG ONLY

- ☐ Robotics and Industrial Control
- ☐ Microcomputers and Microprocessors
- ☐ TV/Video/Audio Servicing
- ☐ Digital Electronics
- ☐ Electronics Design Technology
- ☐ Industrial Electronics
- ☐ Data Communications
- ☐ Communications Electronics + FCC License + Mobile + Aircraft + Marine
- ☐ Basic Electronics
- ☐ Small Engine Servicing
- ☐ Appliance Servicing
- ☐ Automotive Servicing
- ☐ Air Conditioning, Heating, Refrigeration & Solar Technology
- ☐ Building Construction & Remodeling

Name (Please Print) Age

Street

City State Zip

Accredited by the Accrediting Commission of the National Home Study Council

175-104

was eliminated in favor of "erase," because "delete is not a people word." She elaborates: "We try to validate the individual intuition."

JHA tries to look at the world through a child's eyes. In *Duck's Ahoy*, for example, the player moves gondolas in the canals of Venice to gather ducks. Limited to a 16K cartridge, JHA could show the ducks submerged but could not show them swimming safely to shore. To allay any anxieties in young players, the documentation explains that the ducks went swimming, reached the beach safely, and sunned themselves. "Whenever possible, we concern ourselves with the child's perception of the world."

Tom Snyder

In preschool software, the adult's feelings about the software may be more important than the child's, according to Tom Snyder, head of his own educational software development company in Cambridge, MA. "If the software isn't intriguing to parents, the parents don't want to be there. We are overrating the value of young kids interacting with the software by themselves. A young kid alone with software is almost not worth talking about.

"I recommend that parents buy software that intrigues them. Then the parent and child can work together. Then the child can choose some software and get the parent involved."

For the preschool child, "nine-tenths of the reason the kid is at the computer is to get lap-time, access to the parents. There are so many teachable moments that arise—when parents can intervene with an example or an explanation." Accordingly, Tom Snyder Productions (TSP) schedules Parent's Nights for young children to bring in their parents to playtest the software.

Snyder became acquainted with computers almost 20 years ago when at the age of 15 he sent one of his designs to IBM. They responded by delivering hardware parts to his home and encouraging him to experiment. Instead, in the late 60's, he became a keyboard musician with a rock 'n roll band under contract to Capitol Records. He majored in French at Swarthmore College and obtained his master's degree in education from Lesley College in Cambridge, MA. He teaches science and music at Shady Hill School in Cambridge. In 1980, he founded the Computer Learning Connection, but changed the name to Tom Snyder Productions (TSP) in 1983 to distinguish the company name from others in the field.

He comments: "Of all the areas, the greatest potential for 'bogusness' exists in the educational market. It is an open invitation for those with no interest or training in education to do brightly colored,

Tom Snyder

interactive programs and after the fact, deem them educational."

Snyder aims for the collaborative approach in the classroom. In the *Snooper Troops* series of mysteries, students can work singly, in pairs, or on teams. The teamwork fosters cooperation in reaching a goal.

A computer is a great laboratory tool, but it should be clear that it is a tool; the computer is a mild servant.

TSP has also designed simulations for the classroom. In one module Snyder simulates navigation: Groups of kids search for whales and along the way learn to use radar, sonar, and a telescope, and to map in detail. Not only must students cooperate to reach the goal, but they learn the basics of note taking and organizing data. Working with pencil and paper are part of the learning, too.

Snyder believes that "the computer is at its peak value in the classroom when the kid isn't at it. It creates openings in experience: it invites him to look up the Amtrak schedule, to go to another kid and ask how far it is from Detroit to Denver." In terms of teamwork, "you may not learn something unless you repeat it to someone else."

Cooperation would enrich video games, Snyder believes. In the traditional arcade game, "the arcade game player is in a glass sphere. If another person speaks to you, it damages your game. If your eyes leave the screen you die. But if you had a pause button to freeze the action, you could stop, talk about strategy, and get suggestions. Cooperation puts holes in the sphere."

Unfortunately children are usually asked to learn for abstract reasons ("because it's good for you"), Snyder points out. Classroom simulations in which students run a factory or an oil company provide a context of learning for children. Solving a concrete problem serves to motivate the child. One of the students described how much he had learned by playing the factory simulation: "We got to make decisions that really mattered."

Snyder acknowledges that teachers have used games to motivate kids for a long time; the computer provides what Snyder terms "rich, dense opportunities." TSP has a sailing simulation to help teach navigation, in which the stars rise and the earth spins during the program. "When I'm asked why we sweeten it up with sugar, I say that I have to consider the market. Why would anyone buy something that is boring?" he says.

Computers in the classroom should still be considered an experiment he says. "Everyone who can should participate in the experiment. But not to the extent that a great deal of money is spent on computers to replace the curriculum."

Society's expectations for educational software are misguided, he thinks. The boom in the microcomputer market coincided with criticism of the teaching quality in schools. It gave the public the idea that computers can take care of bad education. He says "that's unfair. A computer is a great laboratory tool, but it should be clear that it is a tool; the computer is a mild servant. It can't solve the problem of bad teachers. And we're not in the Toffleresque era of home education. All we have invented is a good alternative to TV. That's a far cry from education."

Snyder foresees more use of Logo. "It helps kids to think procedurally. I also see more and better classroom simulations. The simulations currently available are not advanced; the sailing simulation was done four years ago. I don't know why more hasn't been developed for groups of kids working together. I look for advances in how to structure group dynamics."

Jan Davidson

"If it can be done as well in a book, we don't want to do it. It must be unique," says Jan Davidson, founder of Davidson & Associates of Rancho Palos Verdes, CA, developers of the popular educational packages *Word Attack!*, *Math Blaster!*, *Speed Reader II*, *Classmate*, and *Spell It*.

Davidson, who holds master's and doctoral degrees in language arts from the University of Maryland, also founded Upward Bound, a nonprofit educational association that offers supplemental math and reading courses as well as SAT preparation. Before that, she was a high school

Jan Davidson

and college teacher.

She became interested in computers as a motivational tool. "I have been a teacher for many years and am always looking for a way to motivate students. That's how I got involved with computers. Often, the software will get them started, and they will go on to use books. This is true

Testing is essential to quality. Educational software needs lots of testing.

for both high school students and young children."

Despite her belief in the computer as a motivational tool, she emphasizes, "if a $5 or $10 book offers the same information as software running on a $1000 computer, it doesn't make sense to invest in the software."

For this reason, Davidson & Associates haven't developed complete SAT preparation programs yet. "The students take the test on paper. They are allowed to mark the booklet, to circle and to underline points. I try to create an environment similar to the one they will be in while taking the test."

She thinks "educational software needs to be more quality-oriented, to attack a particular skill or area." One general characteristic to aim for is multiple activities—more than just one game, each building on the previous one in a logical sequence. In addition, she points out that "data disks extend the life of the programs. The additional words in *Word Attack!* and the stories in *Speed Reader II* also provide users with a cost effective way of expanding their existing software without having to purchase new programs."

A third criterion is an editor feature, in which the user can add his own spelling words or math problems.

Further, "testing is essential to quality. Educational software needs lots of testing." If more programs were tested, we would see higher quality software. It needs to be tested for educational soundness; are the materials presented in a way that will motivate the student? It also needs to be tested for bugs. We try to do all the things to it that a student would to make it crash.

"Our emphasis is on the home end of the software market. I see a trend toward more quality and completeness. That extends the life of the products."

Sterling Swift

Sterling Swift, of the Sterling Swift Publishing Company, agrees that quality is essential in educational software. "The real issue in my judgment is the quality of product that is developed. I would rather do fewer products and better products. Frankly, that has been a problem in the education market. Quality builds in a confidence level for the consumer. In the past few years in the software market, some people have been a little greedy."

The Austin, TX based company publishes 64 titles of software and books for the classroom market. Swift, who has a degree in marketing from the University of Texas, is a veteran of college textbook publishing; he worked for the Prentice-Hall College Division for 14 years, in the college division of Harper & Row for five years, and managed the second largest college bookstore in the country at the University of Texas in Austin. Because the bookstore sold everything from trade books to women's clothing, his retail experience made him aware of the computer retailer's problems.

In developing software, he also keeps the average teacher in the classroom in mind, "I have been in the classroom on Monday at 9:00 a.m. and seen those blank stares."

The future of educational software is promising. He says "the computer in K-12 is proving to be a valuable tool. Schools have made major financial commitments, and we have pretty conclusive proof that it is assisting in the educational process. But we need to become more sophisticated about videodiscs, for example.

"The sky is the limit for software development. We want to be on the cutting edge and not get bloody. The idea is to produce the software and bring the market with you. The software is becoming better. Some people are good enough to conceptualize it. The Macintosh in 1984 is where the Apple II was in 1977. People must rethink ways to use the computer—to take advantage of what the Mac has to

Sterling Swift

offer—and not just hook up software to a mouse. That is just dumb," he says.

Swift develops software by helping authors perfect the product, packaging it, and selling it both in the United States and internationally. As enthusiastic as he is about the future of computer software, Swift says "programs that are mostly text,

The sky is the limit for software development. We want to be on the cutting edge and not get bloody.

whether they are 40- or 80-columns, are just page-scrolling—nothing but a waste."

Further, "we've not even scratched the surface of what can be done graphically. Young people today expect the graphics of MTV—substantial use of the visual arts.

"The computer can be a tremendous reinforcing tool, if the program truly deals with problem-solving, as in a simulation, or in a real tutorial."

He gives the example of *Math Worlds*, a middle school math program that deals with manipulation, algebraic functions, and geometry. Students work with manipulation by using a bag of blocks. And "you can use the computer to give you quick access, as a number cruncher. It extends the analysis of a problem. The whole purpose is to present the analysis and reason behind the math manipulation."

Swift's new program, *Graphic Gradebook*, written by Tom Irby, takes *VisiCalc* cells and adds graphics to produce pie and bar charts from the grade information. ■

What's New In Hardware

Desktop Computer from ITT

ITT has introduced the ITT Xtra Personal Computer, an IBM PC-compatible desktop microcomputer. The Xtra uses a 16-bit Intel 8088 microprocessor operating at 4.77 MHz; includes 128K RAM, expandable to 640K; and runs ITT DOS 2.11, an enhanced version of MS-DOS.

The Xtra comes with one 5.25" 360K floppy disk drive and has provision for a second floppy drive or an optional 10Mb hard disk drive. It has one parallel port, one RS-232C serial port, and five expansion slots. A 14" green or amber monochrome monitor, or optional 12" RGB color monitor, mounts on a tilt and swivel pedestal. The Xtra supports an optional 8087 numeric co-processor. The Xtra carries a base price of $2495.

ITT Information Systems, P.O. Box 52016, Phoenix, AZ 85072. (602) 894-7000.

CIRCLE 435 ON READER SERVICE CARD

Apple Compatible Portable

Comp-U-Save has unveiled the Alex 500A, an Apple and CP/M compatible portable computer. The Alex 500A packs dual 6502 and Z80 microprocessors, 64K RAM, two floppy disk drives, and a 5" green screen monochrome monitor into a 15" x 14" x 5" case. It weighs only 18 pounds.

The Alex 500A also includes four expansion slots, one parallel port, one RS-232C serial port, one game port, an RF modulator, and a speaker. It is capable of presenting text in upper-and lowercase in 40-or 80-column mode. An optional DC power converter is available. The Alex 500A carries a suggested retail price of $2495.

Comp-U-Save, Turtle Creek, P.O. Box 1300, Skyland, NC 28776. (704) 274-3003.

CIRCLE 436 ON READER SERVICE CARD

IBM PC Compatible from Canon

The Canon Personal Computer, an IBM PC compatible, features a 16-bit 8086 microprocessor, 256K RAM, two half-height floppy disk drives, a serial port, a parallel port, and five expansion slots. It supports either a monochrome or RGB color monitor and includes an 83-key keyboard identical to the IBM PC keyboard.

Canon includes MS-DOS and GW Basic with the PC. The PC is touted as being able to run most IBM PC software without modification and to accept most plug-in boards. The Canon PC has a base price of $2495.

Canon USA, System Div., One Canon Plaza, Lake Success, NY 11042. (516) 488-6700.

CIRCLE 437 ON READER SERVICE CARD

A New Age Dawns for Microcomputer Programming

Meet PROMAL.™ The First Fast Structured Language That Lets You Program The Way You Always Wanted To. And For Only $49.95.

PROMAL™ is innovative.
PROMAL (PROgrammer's Micro Application Language) was designed to achieve maximum performance from small computers... performance previously impossible except with machine language. And it was developed, specifically, to meet the need for a development system for limited memory environments.

PROMAL is complete.
It's a fast, structured programming language. It's also a true development system, complete with its own command-oriented operating system executive, fast one-pass compiler, and full-screen cursor-driven editor. In short, PROMAL is the complete set of tools that microcomputer programmers have been waiting for.

PROMAL is fast.

Commodore 64 Benchmark (Sieve of Eratosthenes)	PROMAL	BASIC	COMAL	FORTH	PASCAL	
Execution Time (secs.)	30	630	490	51	55	
Object Code Size (bytes)	928	255	329	181	415	
Program Load Time (secs.)	3.9	3.8	6.3	11.9	23.5	
Compile Time (secs.)	8.5	—	—	3.9	108	

As the benchmark results in the table show, PROMAL is much faster than any language tested. From 70% to 2000% faster! And it generates the most compact object code. The PROMAL compiler is so fast that it can compile a 100-line source program in 10 seconds or less. And, not only is it fast in compile and run time, it also speeds programming development time.

PROMAL is easy.
It's easier to learn than Pascal or C or FORTH. It makes use of powerful structured statements, like IF-ELSE, WHILE, REPEAT, FOR, and CHOOSE. Indentation of statements is part of the language's syntax, so all programs are neatly and logically written. There are no line numbers to complicate your programming. And comments don't take up memory space, so you can document programs completely. And with the full-screen editor, you can speed through program development with saves to memory and compilation from memory workspace.

PROMAL is elegant.
PROMAL overcomes the performance limitations inherent in all small systems. It gives you access to the power of the machine. But it doesn't require the complexity of machine language programming. With PROMAL, you can have performance the easy way, since it was developed from the very beginning to work on small systems...elegantly.

PROMAL may be the answer to your programming needs.
Finally, there's an answer to the need for a complete environment for simple and rapid program development. Finally, a new age has begun for microcomputer programmers. Finally, there's PROMAL.

PROMAL is available for the Commodore 64 now.

PROMAL is scheduled for release on the Apple IIe in December, 1984 and on the IBM PC in 1st Quarter, 1985.

PROMAL FEATURES

COMPILED LANGUAGE
- Structured procedural language w/indentation
- Fast, 1-pass compiler
- Simplified syntax requirements
- No line numbering required
- Long variable names
- Global, Local, & Arg variables
- Byte, Word, Integer types
- Dec. or Hex number types
- Functions w/passed arguments
- Procedures w/passed arguments
- Built in I/O library
- Arrays, strings, pointers
- Control Statements. IF-ELSE, IF, WHILE, FOR, CHOOSE, BREAK, REPEAT, INCLUDE, NEXT, ESCAPE, REFUGE
- Compiler I/O from/to disk or memory

EXECUTIVE
- Command oriented, w/line edit
- Memory resident
- Allows multiple user programs in memory at once
- Function key definitions
- Program abort and pause
- 20 Resident system commands, 8 user-defined resident commands, no limit on disk commands
- Prior command recall
- I/O Re-direction to disk or printer (UNIX-like)

EDITOR
- Full-screen, cursor driven
- Function key controlled
- Line: insert, delete, search
- String search and replace
- Block copy, move, delete & write to/read from file
- Auto indent, undent support

LIBRARY
- 43 Machine-language commands
- Memory resident
- Call by name with arguments (I/O, Edit, String, Cursor control and much more

PROMAL runs on Commodore 64s with disk drive.

HOW TO ORDER

☐ Please send me my copy of PROMAL for the Commodore 64 at $49.95 plus $5.00 for shipping and handling at a total cost of $54.95. Satisfaction guaranteed.

☐ Please send me a PROMAL demo diskette for the Commodore 64 at $10 for the diskette plus $2.50 for postage and handling for a total cost of $12.50. (Non-refundable.)

☐ My check is enclosed. ☐ Please charge my purchase to my... ☐ Visa ☐ MasterCard

Card Number _____ Expiration Date _____

Signature _____

Name _____

Address _____

City, State, Zip _____ North Carolina residents add 4½% sales tax.

For quicker response on credit card orders, call:
Toll Free 1-800-762-7874 (In North Carolina 919-787-7703)

Our Guarantee —
Try your copy of PROMAL for 15 days. If you are not completely satisfied, return it to us undamaged and we'll refund your money. No questions asked. Dealer inquiries invited.

SMA *SYSTEMS MANAGEMENT ASSOCIATES*
3700 Computer Drive, Dept. CR-1
Raleigh, North Carolina 27609

CIRCLE 196 ON READER SERVICE CARD

Fujitsu 16sx

The Fujitsu 16sx features a 16-bit 8086 microprocessor operating at 8 MHz, 348K RAM expandable to 1Mb, one 360K floppy disk drive, and a 10Mb or 20Mb internal hard disk drive. It runs the MS-DOS, CP/M-86, and Concurrent CP/M operating systems.

The 16sx includes five expansion slots, one serial port, and one parallel port, and has interfaces for a light pen, monochrome monitor, and color monitor.

The base price of the Fujitsu 16sx with 10Mb hard disk is $4250.

Fujitsu Microelectronics Inc., Professional Microsystems Div., 3320 Scott Blvd., Santa Clara, CA 95051. (408) 980-0755.

CIRCLE 438 ON READER SERVICE CARD

Wrist Terminal from Seiko

From the pages of a Dick Tracy comic book is Seiko's Wrist Terminal RC-1000 with accompanying wrist information system.

Worn like a watch, the RC-1000 contains a LCD screen, has a memory capacity of 2K, holds 80 "pages" of 24 characters, and connects to a RS-232C port. It stores phone numbers, flight schedules, memos, or any other information. It is also a watch that keeps time and dates and has an alarm. The lithium battery lasts for 1.5 years.

The RC-1000 connects to a 5.5" x 2.25" x 5/16" pocket keyboard with 61 keys. The keyboard enters information into the RC-1000. A lithium battery in the keyboard lasts for five years.

The RC-1000 can also connect to a larger controller, which features a Z80 equivalent CPU, 4K RAM, and built-in dot matrix printer. Plug-in ROM packs supply Basic and a variety of programs.

The RC-1000, pocket keyboard, and controller carry a suggested retail price of $340.

Hattori Corporation of America, Consumer Electronics Div., 1330 W. Walnut Pkwy., Compton, CA 90220. (213) 640-8728.

CIRCLE 439 ON READER SERVICE CARD

Personal Robot from Heath

Heath, the company that introduced the Hero Robot, announces a new preprogrammed robot, the Hero Jr.

Hero Jr. contains 32K of built-in routines, a speaker, and an internal 100-year clock. With optional security transmitter and infrared motion detector, Hero Jr. functions as a guard robot. Hero moves by itself or via remote control.

Hero Jr. is programmed to sing "Daisy" and "America" and with optional plug-in cartridges can sing other songs and play various games. Hero Jr. operates for four to six hours between charges, with an optional battery accessory doubling the hours.

Hero Jr. is priced at approximately $1000.

Heath Co., Dept. 150-375, Hilltop Rd., Benton Harbor, MI 49022. (616) 982-3200.

CIRCLE 440 ON READER SERVICE CARD

New Keyboard for PCjr

IBM has introduced a new full-stroke keyboard for the PCjr to replace the old chiclet keyboard. New buyers of the PCjr will receive both keyboards until the supplies of the chiclet keyboard run out. Owners of the PCjr can obtain the new keyboard free of charge from authorized dealers.

IBM also has released a memory expansion unit and power supply that plugs into the right side of the original system unit, giving the PCjr up to 512K RAM. IBM is also selling a speech synthesizer card.

IBM has set up a hotline to answer questions about the PCjr.

IBM Corp. (800) 222-PCJR.

Three New Robots from Tomy

Tomy, the toy manufacturer, has introduced three battery-operated robots, named Dingbot, Verbot, and Omnibot, that are geared for children aged four and up.

Dingbot rolls around, bumps into objects, adjusts course, and keeps on

rolling. Verbot is a voice-activated robot that responds to eight separate verbal commands, which can be programmed

into the robot via a remote control microphone transmitter.

The top-of-the-line Omnibot, a two-foot high programmable robot, has a built-in microprocessor, microphone, digital clock, and cassette tape deck, a remote control transmitter, a moving grasping hand, and a detachable serving tray.

Dingbot sells for $10, Verbot for $65, and Omnibot for $250.

Tomy Corp., 901 E. 233 St., P.O. Box 6252, Carson, CA 90749. (213) 549-2721.

CIRCLE 442 ON READER SERVICE CARD

Three Robot Kits from OWI

OWI has introduced three build-it-yourself robot kits: Memocon Crawler, Mr. Bootsman, and Medusa.

Memocon Crawler, a battery-powered three wheeled robot, can be programmed with a personal computer or

with a special keyboard included in the kit. It holds up to 256 instructions, including sound, light, and movement, in 4K of RAM.

Mr. Bootsman, a battery powered six-legged robot with two speeds, is controlled with a wired control box. Medusa, a battery-powered four legged robot, contains a sound sensor to start it

walking about. It stops after a preset time.

Memcon Crawler carries a suggested retail price of $74.95, Mr. Bootsman sells for $32.95, and Medusa costs $29.95.

OWI Inc., 1160 Mahalo Pl., Compton, CA 90220. (213) 638-4732.

CIRCLE 443 ON READER SERVICE CARD

600 CPS Serial Printer

Florida Data has introduced the Office Serial Printer 130, a dot matrix serial printer with three modes of printing: draft at 600 cps, correspondence at 150 cps, and letter quality at 100 cps. The OSP 130 holds up to ten type fonts, including Florentine Script, Mid Century Proportional, and Arabic. Optional graphics capability is available.

The OSP 130 carries a suggested retail price of $3995. The graphics option costs $100.

Florida Data Corp., 600D John Rodes Blvd., Melbourne, FL 32935. (305) 259-4700.

CIRCLE 441 ON READER SERVICE CARD

What's New In Software

Legal Accounting System

Tandy has released the *Precedent Legal Accounting System*, an integrated time, billing, general ledger, and cash disbursements package based on American Bar Association accounting standards, for the Radio Shack TRS-80 Model II and 12.

The *Precedent* tracks the billing hours of up to 50 people, provides eight billing formats, and includes a report generator. Radio Shack includes a monograph, "Simplified Accounting Systems and Concepts for Lawyers," published by the Legal Economics Section of the American Bar Association, with each package.

The *Precedent* carries a suggested retail price of $795.

Tandy Corp., 1800 One Tandy Center, Fort Worth, TX 76102. (817) 390-3300.

Tandy Corporation/Radio Shack

CIRCLE 444 ON READER SERVICE CARD

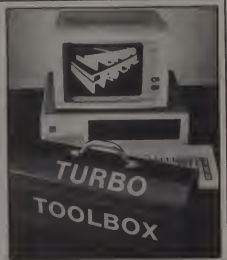
Turbo Toolbox from Borland

Borland International has unveiled *Turbo Toolbox*, a program development package designed to complement its Turbo Pascal compiler for Z80, 8088, and 8086 microprocessors. *Turbo Toolbox* assists programmers in developing Pascal programs containing search and sort capabilities.

Turbo Toolbox consists of Turbo-ISAM (Index Sequential Access Method), Quicksort, and General Installation Program (GINST). Borland includes the source code with its programs.

Turbo Toolbox carries a suggested retail price of $49.95.

Borland International, 4113 Scotts Valley Dr., Scotts Valley, CA 95066. (408) 438-8400.



CIRCLE 445 ON READER SERVICE CARD

Potpourri of Programs

American Training International has released two interactive disks, *Spreadsheet Sampler* and *Word Processing Sampler*, demonstrating popular software packages. Each disk offers ten minutes of hands-on use per program and runs on the IBM PC and compatibles.

Spreadsheet Sampler contains *Lotus 1-2-3, SuperCalc, Multiplan, VisiCalc, PeachCalc, Microplan, Perfect Calc*, and *EasyPlanner*. *Word Processing Sampler* contains *WordStar, Microsoft Word, MultiMate, Benchmark, EasyWriter II, PeachText, Perfect Writer*, and *Spellbinder*. Each Sampler retails for $12.95.

American Training International, 12638 Beatrice St., Los Angeles, CA 90066. (213) 823-1129.

CIRCLE 446 ON READER SERVICE CARD

TK! Solver for TRS-80 Model 4

TK!Solver, a mathematical analysis package for engineering, finance, and education applications from Software Arts, is now available for the Radio Shack TRS-80 Model 4.

TK!Solver, with 34 built-in mathematical functions, solves equations in a fraction of the time it takes by hand. It also uses successive approximations to solve an equation with unknown variables.

TK!Solver requires 128K RAM and retails for $299.99.

Software Arts, 27 Mica Ln., Wellesley, MA 02181. (617) 237-4000.

CIRCLE 447 ON READER SERVICE CARD

MicroPro Releases Three New Titles

MicroPro has added *WordStar for PCjr*, *ChartStar*, and *TelMerge* to their product lines.

WordStar for PCjr is a customized version of the *WordStar* word processing program for the IBM PCjr. It includes an on-screen, interactive tutorial and is completely compatible with *WordStar* running on an IBM PC.

ChartStar is a complete business graphics package providing line, bar, pie, organizational, scatter, and Gantt charts. It offers three-dimensional pie and bar charts, five different text fonts, and the ability to string several charts together to form a slide show. *ChartStar* can read data files from MicroPro's *CalcStar*, *InfoStar*, and *PlanStar*, as well as *Lotus 1-2-3*, *VisiCalc*, *SuperCalc*, and *Multiplan*. *ChartStar* runs on the IBM PC and requires 192K and a graphics printer or plotter.

TelMerge converts *WordStar* document files into standard ASCII files and sends them through electronic mail services. *TelMerge* installs into *WordStar* version 3.3 on the IBM PC.

ChartStar sells for $395. Suggested retail prices for *WordStar for PCjr* and *TelMerge* have not been set.

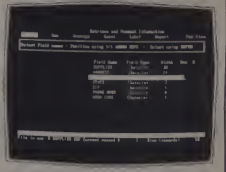
MicroPro International Corp., 33 San Pablo Ave., San Rafael, CA 94903. (415) 499-1200.

CIRCLE 448 ON READER SERVICE CARD

dBase III for IBM PC

Ashton-Tate has released *dBase III*, a relational database management system for the IBM PC and compatibles. dBase III requires 256K RAM, two disk drives, and PC-DOS 2.0 or greater.

dBase III can hold more than two billion records per database with up to 128 fields per record. It uses the same dBase programming language used in *dBase II*, which allows for customized application programs. *dBase III* contains full on-line help and an extensive tutorial.



dBase III retails for $695. A demonstration and tutorial disk sell for $9.95.

Ashton-Tate, 10150 West Jefferson Blvd., Culver City, CA 90230. (213) 204-5570.

CIRCLE 449 ON READER SERVICE CARD

Electronic Mail Program with Voice

Texas Instruments has released *EtherVoice*, a software package that offers users of TI Professional Computers tied into local area networks the option of sending voice messages. *EtherVoice* operates in conjunction with EtherMail electronic mail system and the TI Speech Command system.

EtherVoice records voices in two modes: high quality at 9600 baud and normal quality at 2400 baud. *EtherVoice* requires a TI Professional Computer, 256K RAM, hard disk, and the Ether-Series LAN software. The package carries a suggested retail price of $150.

Texas Instruments Inc., Data Systems Group, P.O. Box 809063, Dallas, TX 75380. (800) 527-3500.

CIRCLE 450 ON READER SERVICE CARD

TRS-80 Utilities

Keene Computing has introduced *XU*, a utilities package for Radio Shack Model I, III, 4, and 4P running LDOS, NEWDOS, MULTIDOS, DOSPLUS, and TRSDOS 1.3 and 6.1. *XU* includes a RAM disk, string search, command file linker, file copier, and ten other utility programs. *XU* costs $45.

Keene Computing Services Co., Box 13044, College Station, TX 77841.

CIRCLE 463 ON READER SERVICE CARD

En Fleur has released *Windowpad*, an integrated windowing and note processing utility for the TRS-80 Model II and III running TRSDOS. *Windowpad* loads into the top of memory, functions independently of Basic programs, and permits short text writing and editing without interrupting the primary program. *Windowpad* sells for $21.25.

En Fleur Corp., 2494 Sun Valley Circle, Silver Spring, MD 20906. (301) 598-4532.

CIRCLE 464 ON READER SERVICE CARD

Scilab has announced *Autoref*, a utility that searches through a manuscript, pulls out citations, and automatically creates a bibliography. *Autoref* runs on the TRS-80 Model I, II, III, 4, 12, and 16 under any operating system. CP/M and MS-DOS versions are also available. *Autoref* retails for $89.95.

Scilab, Inc., P.O. Box 614, Guilderland, NY 12084. (518) 355-3363.

CIRCLE 451 ON READER SERVICE CARD

Communications Package for TRS-80 Color Computer

Computerware has introduced *Color Connection II for Flex* and *Color Connection II for OS-9*, modem software packages for the TRS-80 Color Computer. Both menu-driven programs support 300 baud with full or half duplex, read and write standard ASCII files, support automatic dialing, and include a user-defined macro feature for fast input of ID and passwords.

Color Connection II for Flex and *Color Connection for OS-9* sell for $51.95 each.

Computerware, Box 668, 4403 Manchester Ave., Suite 103, Encinitas, CA 92024. (619) 436-3512.

CIRCLE 452 ON READER SERVICE CARD

INTRODUCING MICROSCI. THE VERY PERSONAL COMPUTER.

If you're buying a personal computer for the first time, you don't need the biggest and brightest to begin with.

Think simple.

Sensibly priced.

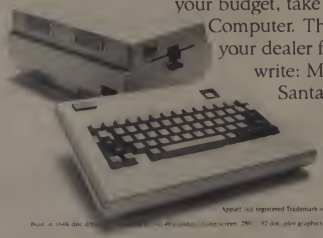
Less than **$799.**

Of course, you'll want some initial training to get you started. The Havac comes with its own disk operating system and "Training" software like Typewriter, Calculator and Havacom for communications. And once you've mastered the basics, you can use software from the largest selection in the world.

Apple® Software.

Game-like computers that are comparably priced can't offer software like Havac can. But if games are your bag, Havac has a Joystick/Paddle port. And a port for RS-232C, Parallel/Serial printer or an additional disk drive. Which we also make. Havac already has one disk drive built in.

So, if the biggest and brightest are beyond your budget, take a look at The Next Best Personal Computer. The Havac from MICROSCI. Ask your dealer for a simple demonstration or write: MICROSCI, 2158 Hathaway, Santa Ana, CA 92705 (714) 241-5600.



μ-SCI
MICROSCI
A STANDUN CO

Apple® is a registered Trademark of Apple Computer Inc.

Built-in 104K disc drive, 40 column, 53 key screen, 280 × 192 dot color graphics, 4 cursor keys and 2 special function keys. Compact and transportable. Made in America.

CIRCLE 194 ON READER SERVICE CARD

creative computing
FIRST IN COMPUTER APPLICATIONS
10th ANNIVERSARY YEAR 1975-1985

CHOOSING & USING AN INTEGRATED SOFTWARE PACKAGE

How to Buy an Integrated Software Package
Integrated Packages: A Closer Look
Previews of Coming Attractions
Directory of Integrated Software Packages
Manufacturer Listing

How to Buy an Integrated Software Package

GEORGE BLANK

Last year every software producer was claiming that his software was "user-friendly." This year's glamour term is "integrated." It is much simpler for software to be integrated than it is to be easy to use. All "integrated" implies is that there are two or more functions that work together.

Leaving aside the minimal definition, integration has come to imply more in computer software.

Although integration is claimed for packages that do not meet these standards, we are beginning to expect that integrated software packages will:

- contain several parts that are normally separate application programs.
- share data easily between the parts.
- use a common command set.

Software that meets those three requirements can be, but is not necessarily, more useful than a collection of standalone application programs. If the functions are useful in a common task, as spreadsheets and graphics are useful in producing management reports, then people who have to do that task should find it easier to use one program than two. However, people who need only one of the functions may find it easier to use a package that offers only what they need.

Power in software comes at a price. I need a much more powerful word processing program than my wife does. My documentation writer needs a more powerful program than I do. My wife usually writes only letters and needs a simple program that is easy to learn and use. I use a word processor to write programs. I need to be able to copy and move information easily, especially to take parts of old programs to use in new ones. Our writer prepares software manuals. She needs facilities for processing large documents. I use yet another program for writing articles like this one. It is a little more powerful than my wife's letter writing tool, but easier to use than my programming tool.

If I can't even find a single word processor that will handle all my writing needs, can I expect to find a single integrated program that will handle all my needs? Probably not! It is not enough for an integrated package to "have" the applications you need; it must also be appropriate to your needs and do those applications well.

The second area of concern in integrated software is the ease of sharing data. You should be able to pass data from one application to another as easily as you can copy a sentence from one part of a word processing document to another. There should be no need to access the disk or create a file to go from one application to another. If you do have to create a file, then you should not have to do any intermediate processing of the file.

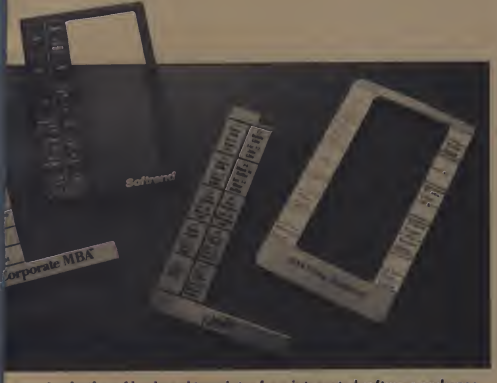
Sometimes you will configure programs or modify them for special purposes. Modifying programs raises another important issue—copy protection. If I modify a program for a specific purpose, I want to keep it separate from the original. I can not do that if the program is copy protected. If you modify a copy protected program and something goes wrong, you have destroyed the disk. Even without modification, all disks fail eventually, and I am unwilling to make the survival of my business dependent on a few magnetic signals in a layer of rust on a single piece of cheap plastic.

When considering how easy it is to pass data from one module of an integrated package to another, it is also important to consider how easy it is to pass that data to a different application program. I had my company mailing list on *Versaform* on the Apple II. When my mailing list got too big for *Versaform*, it was extremely

difficult to transfer and convert to another system—so difficult that I eventually abandoned the list. *Versaform* uses the UCSD operating system, and although I purchased a communications program for that system, I could never get it to work. Therefore, I now avoid the UCSD operating system.

In general, you can expect trouble transferring files between operating systems. *Aladin* claims to be able to read files from both MS-DOS and the UCSD system. I will never again put a significant amount of information into a system that will not write straight ASCII files onto a common operating system. That way, if the program becomes unsuitable, I can at least move the data, over a modem if necessary, to a new program or a new computer.

The third desirable feature of an integrated software package, a common command set, is subject to more limitations. The purpose of separate applications is to do different things. If a word processor performed the same functions as a database manager, you would need only one of them. Because they do have different functions, however, they need different commands. But there are many functions that are common to different



A selection of keyboard templates from integrated software packages. These handy plastic or cardboard references provide help in remembering the large number of commands necessary to implement the many functions offered by often complex software package.

applications, including saving and loading files, asking for help, and simple editing.

Newer computers have dedicated keys, like the page up, page down, home, end, insert, and delete keys on the IBM PC. Most applications take advantage of these, and to the extent that they do, there is less need for integrated software. There are even some common uses developing for other keys, such as the F1 for a Help key. But it is unlikely that all the keys will acquire standard uses, and until they do, an integrated software package that uses the same keys to do the same tasks will be easier to learn and use than separate applications. But it is more important to have a *good* command set than it is to have a *common* command set.

I wish selecting a program could be as easy as asking: "What is the best integrated software package?" There can never be such a package, simply because different people have different needs. Unfortunately, there are two questions to be answered: "What are my needs?" and "Is there an integrated software package that meets my needs?" The most popular integrated software packages have three major functions—spreadsheets, word processing, and data base management—and two supporting functions—graphics and data communications. Some have additional functions as well.

In most cases, one of the three major functions is dominant. If your needs revolve around columns of numbers, you will probably find a package built around a spreadsheet, like *Symphony*, best for you. If your needs revolve around word processing, a package built around a word processor, like *PeachText 5000*, might be most useful. You might also want a special purpose integrated package. Perhaps the most ambitious integrated product line is Prentice Hall's *The Profit Center*. It has 21 modules built around an accounting system, which is really a special purpose database.

It is also important to determine if a package has any serious flaws for your application. The day before I wrote this, I was talking to the owner of a Health Food store who keeps his inventory on a TRS-80. With his first inventory package, from Radio Shack, he went to print out a purchase order. Thirty hours later, he pressed the break key. His Radio Shack salesman told him he had ordered too many items from one supplier!

The most elementary serious flaws are missing features. If you need a spreadsheet, a package like *Offix*, which doesn't have one, is not the right package for you. If you do financial calculations frequently, you might insist on a spreadsheet that calculates net present value and internal rate of return. But other flaws can destroy the utility of a program. The *Silicon Office* has many nice features in its word processor. But the response time, including cursor movement through the document, is so slow that I can't bear to use it. The most important rule is: think through your needs thoroughly before you buy.

In general, it is not possible to buy an integrated software package based on either advertisements or reading the manual. During this assignment I wanted to select a package for my own company. Many times I would read a press release, an advertisement, the jacket copy, or a manual and get really excited about a product. Then I would start to use it and find it completely unsuitable.

In particular, I am concerned about absence of problems, ease of use, ease of learning, and speed. For that reason, there are several places on the charts that follow in which I offer my judgment on a program rather than an objective score. For example, though I am not a fast typist, I can't use a word processor that drops characters when typing or overshoots when I am moving the cursor through text. The category 'OK for fast typists?' is my assessment of the problems I encountered. (What was my decision for my own company? I haven't decided yet, but I have narrowed the choices down to *Symphony*, *ITSoftware*, and *InteSoft*.) ■

Integrated Packages: A Closer Look

PRODUCTS FOR APPLE COMPUTERS

III E-Z Pieces/Appleworks/ *III E-Z Pieces* is an integrated software package for the Apple III; Appleworks is the identical package for the Apple II. It combines an excellent database manager with a good spreadsheet and word processor. Although not as fast, powerful, or full featured as *Symphony*, this is a strong business package that should meet most people's needs. It is the only integrated software package that I noticed in daily use at *Creative Computing*. If you own an Apple III, you don't have to wonder which integrated software package to buy. (Apple II owners have a choice.) Haba Systems also sells *Graph'n'Calc*, an add-on for business graphics and is developing a communications program.

PractiCalc II/ *PractiCalc II* is sold as an integrated package for the Apple II series. It has a good spreadsheet with limited database and extremely limited word processing and graphics functions. I wouldn't dream of using their "word processing" for anything other than putting titles on my spreadsheet reports. The manual is poorly done and hard to use.

Jane/ *Jane* brings the graphic icons and mouse from the Macintosh to the Apple II series. While *Jane* includes windows, word processing, spreadsheet, and mailing list management in an integrated package, none of the features is strong enough to stand alone. The list manager limits you to ten fields that cannot exceed 25 characters, the word processor can be used for form letters only if you manually cut and paste the address data from the mailing list to your letter using windows, and the spreadsheet was too limited to run our benchmark.

I did not have the mouse and was not happy using a joystick. It took me more than two minutes to pick up the scissors icon, move to the word Friday in a sample letter, cut (delete) it, pick up the insert icon, move back to my text location, and insert the word Saturday. Fortunately, you can substitute control keys for the icons; Control-E for scissors and Control-W for insert. *Jane* is definitely not a manager's productivity tool. However, it may be one of the few practical home computer applications. It seems to offer a lot that my 11-year-old son can use in doing his school work. This is the first word processing package that I did not consider too intimidating for him. Although the word processing does not work with my 80-column card, the program uses graphics to provide lowercase, using the Escape key to switch case. The manual is clear and well done, mercifully brief, and well illustrated. The program also has a help disk with animated help messages.

PRODUCTS FOR IBM PERSONAL COMPUTERS

IBM PC Part I: Best Buys; Full Featured Products

Symphony/ Lotus is the current king of the integrated software package makers. After all, it was *1-2-3* that dominated the market last year as the best selling software program. *Symphony* is their attempt to stay on top. There has been some disparagement of *Symphony* by those who say that all Lotus did was add 4 and 5 (word processing and communications) to 1, 2, and 3 (spreadsheet, database, and graphics). *Symphony* may have limits, but it is an excellent program. One problem is that it needs a great deal of memory. Our spreadsheet benchmark ran out of memory at 2145 cells in a 384K Compaq. The other problem with *Symphony* is that it is deeply rooted in the spreadsheet. There are many database functions, but if you need a very powerful database manager, you may need a different program.

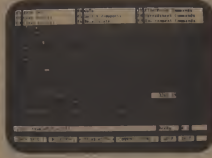
Symphony is too powerful to be easy to learn. You must sift through several levels of menus to execute a simple command, and it is not always easy to figure out what sequence of commands to use. *Symphony* has a powerful macro language that allows the creation of complete applications with automatic, prompted input and switching from one task to another.

Lotus has even provided "hooks" into *Symphony* so that other software houses can add machine language features that are not already included. We may be seeing dictionaries added to the word processor or 3-D paint routines added to the graphics. The word processor in *Symphony* is excellent.

ONE OF THE MOST important questions to ask about integrated software is "Are the applications good enough to stand alone?"

ITSoftware series/ Instead of writing a series of integrated software programs, ITSoftware (a division of Martin Marietta Corp.) seems to have licensed some of the best free standing programs on the market and developed an interface to link them. For example, their spreadsheet, Calcit, is licensed from DataMension Corp., and their word processor, Writlt, is actually *MultiMate*. The database manager, Keeplt, was written in-house and is the application used to integrate the rest of the series. Calcit comes with a disk labeled Interface to Keeplt, and Writlt has a format conversion utility to accept ASCII and DIF files.

One of the most important questions to ask about integrated software is "Are the applications good enough to stand alone?" In this case, the answer is an obvious yes. However, the package does exhibit the problems you would expect from integrating separate programs. The programs do not have a common command structure, and the manuals



IBM PC Part II: Best Buys; Light duty programs

are of uneven quality. For example, the WriiIt manual gives a full explanation of setting up your disks, while CalcIt tells you to see the DOS manual for instructions on backing up your disks and makes no mention of putting DOS on your program disk.

Nevertheless, this is one series that I really like. The series is backed by a huge company with a solid background in information processing. The individual applications are outstanding, and interfaces are provided to make them work together. None of the disks is copy protected, but the communications program, LinkIt, contains the best anti-piracy feature I have seen.

The program is designed so that it cannot communicate with a backup of itself. If you look at the spreadsheet benchmark, you will see that CalcIt is one of the fastest spreadsheets. Actually, CalcIt took three seconds to do the calculations and the other five seconds to rewrite the screen! Other packages include MailIt (3270 Electronic Mail using the Irma board), AskIt (a mouse driven front end for KeepIt), ShowIt (graphics), StatIt (statistics), EditIt (program editor), PassIt (file transfer), and SortIt.

InteSoft series/*InteCalc* is one of the best full featured spreadsheets on the market. It is now serving as the anchor for a series of stand-alone applications that work together. The word processor, InteWord, is also very good, including support for proportional spacing on the printer. About the only feature I didn't like was the inability of the backspace key to wrap to the previous line. InteMate is an integrating shell that can integrate not only the InteSoft applications, but other programs as well, passing data between applications. InteMate also includes customizable menu screens, a calculator, an editor, and a notepad. InteBase, the database manager for this series, has not been released. Each of the packages comes with a huge, heavy, awkward manual with full size pages in a three-ring binder. The presentation of information is good to very good. This series illustrates one of the drawbacks of packages that are *not* copy protected; it took more than two hours of formatting disks and copying files to set up the program and make backup and working disks.

Electric Desk/*Electric Desk*, from Alpha Software, is a clear winner. Among the packages tested, it is far easier than average to install, learn, and use. The word processing and spreadsheet functions are as strong as stand-alone packages. The database manager is limited, lacking calculated fields, and there are no graphics functions. The first day I tried it, I taught a co-worker to use the word processor in ten minutes.

The program comes on a single disk, and all applications are available at once. If you have enough memory, you can have nine spreadsheets, nine databases, nine word processing documents, and two communication environments open at the same time. It is easy to shift data between applications.

There is a mistake in the installation instructions, which fail to tell you to copy COMMAND.COM to your master disks. The system will not work until you do. This system worked fine in my single drive Compaq, and a version is even available for the PC jr, using a ROM cartridge to make up for the limited memory of that system. Special abilities include automatic phone dialing (with a Smart Modem) using phone numbers from the database, form letters, and a good communications program. Setting up the program for my printer was also quite simple, using the word processor to change the configuration file.

The database allows up to five index fields, and automatically updates the indexes whenever a record is created or changed. There is a powerful search facility. This is a good system for the user who does not need the heavy duty power of the multi-disk systems. Certainly home users, small business people, and managers who need only limited databases should be happy with the *Electric Desk* unless they need graphics.

The IBM Assistant Series/ IBM's own entry in the integrated software market is a repackaged pfs Series from Software Publishing. These products are best sellers that have been favorably reviewed. Because they are often suggested as good programs for beginners, I recommended *PFS: Write* to a business associate. She has had a great deal of trouble learning to use it, so they may be overrated for novice use. My own assistant blew her only opportunity to make a backup of the Writing Assistant; her backup doesn't work at all and you only get one try. I personally found the packages easy to learn and use, and the manuals adequate, though poorly indexed. The spreadsheet package, Planning Assistant, is not yet available. I would prefer the *Electric Desk* for beginners, but these are good packages.

Offix/*Offix* is an easy to use, lightweight database manager with minimal word processing and a form letter generator. It comes in a small vinyl package shaped like a file folder, for $149. When you start the program, the screen displays two filing cabinets, with three drawers in each. At first, five drawers are labeled Empty Drawer and one Miscellaneous.

At any time, pressing the F1 key gives you a menu of the commands available at the current screen, and the F2 key provides help messages for the current screen. You select a drawer and press O to open it. You then see eight file folders with titles on top. Again, you select a folder, and press T to take it out. You then press O to open the folder. This will give you a menu of reports in that folder. You then select a report and open it. Now you can do word processing, define a form, do data entry, or make a report.

I love the manual for *Offix*. It is a 16-page, 3" by 6" brochure. The system is easy enough to use, and the tutorial lessons and help screens are good enough that nothing else is needed. Although the word processing is minimal, this is a very handy database system, allowing 100 folders in each of the six drawers with an unlimited number of documents in each folder. Each folder can hold up to 1,000,000 characters on a hard disk or one disk full of characters on a floppy disk. Depending on memory, documents can be from 30,000 to 200,000 characters.

IBM PC Part III: Special purpose and other products.

The Profit Center/ Probably the most ambitious series of integrated software programs is *The Profit Center*, from Prentice Hall. *The Profit Center* is a series of 21 modules of accounting and business software programs. The four modules I received included General Accounting, Word Processing, Time and Information Management, and a Master Menu. These packages are available bundled as The Complete Office for $375.

The Master Menu is used to access and manage the system, and each application must be installed, a process that generates reference files on each of the other system disks. Each part of the program includes 50 to 100 files. The spreadsheet has not yet been released. The Business word processor has a great deal of power, but is not easy to use and has a confusing menu.

Corporate MBA/ *Corporate MBA*, from Context, may be the most powerful package you can use without having to switch disks while using it. It is superb at presenting information graphically on the screen. You can have dozens of graphs packed into individual cells and expand any of those cells to fill a window or even the screen (before expansion, they just display the letters GRF to indicate that a graph is stored in that cell.)

You can have four windows at a time. Thus, if you wanted to use pie charts to display the relative sales of your product mix for a series of years, you could easily select years and display 4 charts on the screen at once. Since you can store a great deal in a single cell, including a letter or a database input form as well as a graph, this is a marvelous tool for a person who thinks graphically.

Corporate MBA supports mainframe communications (with the Irma board) and electronic mail. Unlike its predecessor, *Context MBA*, *Corporate MBA* operates under MS-DOS, allowing you to share data created by other programs easily. The data input format for the database is especially easy to use, and MBA's macro command language allows sophisticated turnkey applications to be developed.

I discovered two drawbacks to *Corporate MBA*. First, it can be terribly slow. It took three minutes and eight seconds to recalculate our 2500-cell spreadsheet benchmark. That is 23 times as long as *InteCalc* and Calcit took to perform the exact same operation. Another indication of slow speed was the 15 minutes that program took to replicate a row of 25 formulas into 99 additional rows.

The other drawback is the editor, which, like the other programs reviewed that are written in Pascal, is a modified version of the UCSD editor. Unlike *Jack2* and *Encore!*, the modifications were extensive enough to make the editor acceptable for word processing, but I do not like the design, complexity, potential for losing data, or methodology of that editor. You enter the editor in a command mode and must enter insert mode to enter text, then press Control-C to keep your text and return to command mode. If you press Escape instead of Control-C, even by mistake, you lose your text. You also waste a lot of time going to and from command mode instead of going directly from one operation to another.

Jack 2/ *Jack2* is a reasonably easy to use, light duty integrated package. It has a decent word processor and a good database manager. While it does not have a spreadsheet, the database manager offers most spreadsheet functions. I could get only 1000 of the 2500 cells for the spreadsheet benchmark into my 256K Seequa Chameleon before I ran out of memory.

Bar and line graphs can be produced within the database, but that is the extent of the graphics functions. While I found the word processor tolerable, it is a modified UCSD editor and some simple commands can take several keystrokes. When you type fast, the keystrokes are stored in a buffer until the screen can catch up with the display.

Jack2 is a fairly sophisticated, yet easy to use database manager. You design a form with your layout, titles, data formats, calculation rules, and even graphs specified. Then you access a record and fill in the data. You can even have processed text and information merged from other records in a form. Because *Jack2* uses the UCSD p-system, has no communications built in, and is not set up for external data, it is not a good choice if you want to use data created by other programs.

Encore!/ *Encore* is an extremely powerful financial modeling system with several flaws. The "word processing" is simply the UCSD Pascal line oriented editor with the prompts translated into plain English. That is an improvement over the original, but it is unsatisfactory for any document larger than a crude memo. The spreadsheet is rule oriented (you enter a calculation rule for a row or column instead of putting a formula in a cell and replicating it).

There was not enough memory in

the 256K Seequa to run the spreadsheet benchmark. After calculating 2000 cells in 21 seconds, the program ran out of memory and locked up. I had to use Ctrl-Alt-Del to restart the program. Since the UCSD p-system makes it hard to import data, the editor is unsatisfactory, and the spreadsheet crashes, I would avoid this system.

However, since the package includes built-in functions for ACRS, straight line and accelerated depreciation, internal rate of return, loan amortization, net present value, tax loss carry-forward, and U.S. Tax schedules for individuals, married couples, corporations, estates and trusts, people who have financial applications will want to consider this program further.

Graphics functions include five types of bar charts, including floating bar charts, point graphs, line and shaded line graphs, pie charts, scatter charts, and Gantt charts. Charts can be sent to a plotter. This is very definitely a financial modeling system rather than a general purpose database manager.

Window Master /*Window Master,* from Structured Software group, seems to be a powerful program, but the documentation is so poor that it is extremely difficult to learn. This program allows you to run concurrently up to seven programs, and you can even mix MS-DOS and CP/M-86 programs. Window master alone is $295, but there is a package deal that includes *Window Master,* the *Magic Window* spreadsheet, *Word Right* word processor, *NAD* name and address system, and *Analyst* data entry and report writing system for $495.

One of the most attractive features of this package is its macro programming language, Script, which allows you to develop applications that run automatically with pauses for appropriate user input. You can use the window manager with other programs, including *1-2-3,* and you can transfer data between applications.

After a half day of trying to run this package, I succeeded in running the spreadsheet benchmark only by crashing the demo disk. I never succeeded in installing the word processor or the database manager. The installation instructions in the MS-DOS package were for the CP/M version. While the *Analyst* database manager allows up to 50 fields per record, each record is limited to a maximum of 255 characters. *Window Master* is really an operating environment that competes with Microsoft *Windows, VisiOn,* and *Desq.* In general, these windowing packages require accomplished programmers to install them.

Aladin /*Aladin* is a powerful database manager. While it does not have a word processor, it has an interface that allows you to use documents created on word processors to produce form letters and reports with *Aladin* data. Although the documentation describes the *Aladin* calculator as a spreadsheet, it is really a report generator for the information in the database. Its modified B-tree index is said to be capable of accessing any one of a million records in less than one second. This product is better positioned as a competitor for *dBase III* than *Framework* or *Symphony.* I would consider *Aladin* for a serious information management application.

The Ultimate /*The Ultimate* was really designed as a form letter processor for use with the U.S. Post Office's now discontinued ECOM service. The communications are so specific for that system that they are essentially useless now. The word processor is good for "quick and dirty" jobs like memos or class notes, but it is primarily line oriented and offers little power. The spelling checker is very slow and the database manager is a simple name and address system. Although this system had an original price of $495, our local software store is selling it for $99—mainly to people who ask for a mailing list program.

T/Maker Integrated Software /*T/Maker* was one of the earliest database programs. It is organized around the concept of data tables (Table/Maker) and offers its own approach to database management. The new integrated package includes word processing, database, spreadsheet, list processing, graphics, data transfer, file management, and spelling checker. Actually, that list promises more than *T/Maker* delivers. For example, the "graphics" is limited to bar charts, the word processor is a line editor without word wrap, and files are limited to about 800 records, though you can link more than one file in a database.

The center of activity in *T/Maker* is the editor. *T/Maker* is command driven, with cryptic commands and minimal use of prompts and menus. Much of the time, the screen just asks WHAT NEXT? and you must answer with the correct command, though the PC version allows you to enter C for a command menu. *T/Maker* is not up to the competition in the MS-DOS market, but their CP/M 80 products are worth considering.

Aura /*Aura* comes on ten disks with word processing, spread sheet, database management, and business graphics. There are two large manuals, a tutorial manual and a reference manual. The system is designed for a hard disk, and although it will work on a floppy based system, it is too clumsy to be usable; it takes five disks just to start using a spreadsheet. Because the system makes direct calls to hardware, it is not recommended for compatibles other than the Compaq; it gave my Seequa indigestion. The system is slow; it took 15 minutes to copy one row of calculations to 99 more rows for our spreadsheet benchmark, then another 15 minutes to delete those rows for the iteration test.

ONE OF THE MOST attractive features of this package is its macro programming language, Script, which allows you to develop applications that run automatically with pauses for appropriate user input.

We tested it on a 448K IBM PC, and 63% of memory was still available after entering our benchmark. The system makes good use of color, and has excep-

tional graphics, including a free draw routine. It is organized around the database and offers a good level of integration, allowing you to put individual fields from the database into spreadsheet cells, drop portions of the spreadsheets and graphs into word processing documents, and draw graphs without leaving the spreadsheet. It does not, however, fail gracefully; when I anticipated changing a disk and put it in early, the system just locked up.

The Silicon Office/*The Silicon Office* claims to be the European leader in integrated software. Instead of copy protecting the software, they provide a circuit board and an encoded ROM cartridge. You can copy the software as much as you want, but unless the right ROM is attached to the circuit board, it won't run. Instead of a three-ring binder, they provide three oversize perfect bound booklets that refuse to lie flat and take up too much space for most work stations.

Silicon Office is really a database system with a text editor. There is no spreadsheet, graphics, or communications. I found the response time in the text editor too slow; I would always overshoot when I tried to delete characters or move to a position in the text. The database is powerful, but you have to learn their query language before using it. At the suggested retail price of $795, it offers much less than the competition.

Executec Series One Plus/ Sometimes you must read between the lines to discover a flaw in a package. With this package, the minimum memory requirement of 192K was also listed as the optimum amount of memory. Later in the manual, the reference to out of memory errors referred to text files approaching 64K, and the spreadsheet benchmark ran out of memory after 1450 cells.

I suspect that this package was designed to limit data to 64,000 characters. This is a serious shortcoming in a spreadsheet or word processor, though it is perfectly reasonable in a database manager, where most information is stored on disk and only the current record is available in memory.

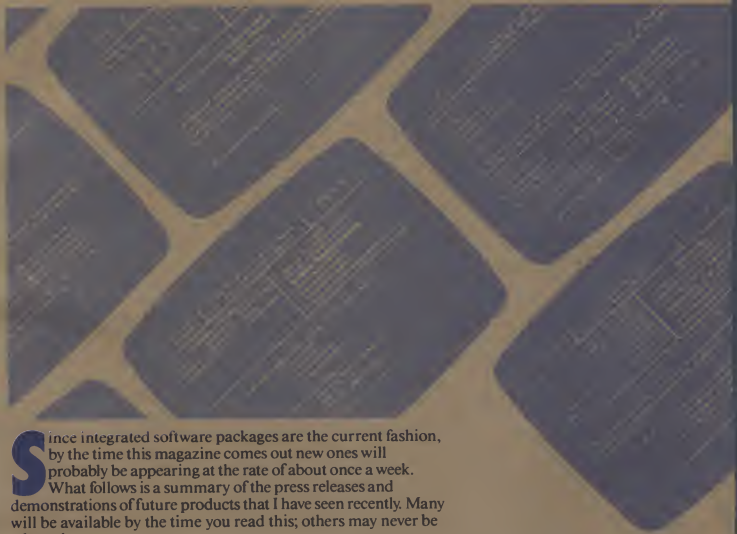
The word processor has problems with overshooting. Since the spreadsheet is also slow, and the command structure is clumsy and inconvenient, this package should be thought of as a database manager with extra functions, not as a competitor to *Symphony*. The report generator, ExecuReporter, is capable of combining data from six files to produce a report with a data format up to 300 characters by 1000 lines. Execulink provides communication to a mainframe. Additional programs include financial analysis for banking and finance institutions. ■

INTEGRATING PROGRAMS VS. *INTEGRATED* PROGRAMS

IN ADDITION TO THE INTEGRATED SOFTWARE PROGRAMS described in this section, there is another class of programs that is intended to integrate software packages from different suppliers. These packages may offer a number of features, including data transfer between programs; concurrent execution of programs; print spooling; calculators; notepads; windowing; combining text, spreadsheets and graphs into single documents for printing; advanced graphics; and other features. Two of these programs, *InteMate* and *Window Master*, because they are also sold with bundled applications, are described in the reviews. The best known package of this type, *VisiOn* from VisiCorp, is also sold with dedicated applications available. Other contenders in this market are Microsoft *Windows* and *Desq* from Quarterdeck Software.

***Press'n'Plot*, from American Programmers Guild, combines screen images from graphing programs and text from word processing programs, and allows further processing such as rotating images, moving text around, clipping, and sizing. *Press'n'Plot* sells for $149, and a stripped down version that just captures screen images and prints them is available for $49. ■**

Previews of Coming Attractions



Since integrated software packages are the current fashion, by the time this magazine comes out new ones will probably be appearing at the rate of about once a week. What follows is a summary of the press releases and demonstrations of future products that I have seen recently. Many will be available by the time you read this; others may never be released.

SOME LIGHT DUTY PROGRAMS

Creative Series/ Creative Software released *Creative Writer, Creative Filer,* and *Creative Calc* for the Commodore 64 in early 1984. Versions for the IBM PC and jr and the Apple II are due to be released this year. This is a budget series with a list price of $49.95 for each package. Although the three packages are advertised as integrated, the 32-page booklet that serves as the *Creative Calc* manual makes no mention of using data from or passing it to the other two programs. Nevertheless, this is the obvious choice for Commodore owners, and possibly for Apple owners as well. I recommend *Electric Desk* on the PCjr, but the Creative series will be available for half the price.

Get Organized/ Electronic Arts has announced *Get Organized,* due in September, with seven applications. These include word processing, telecommunications, data manager, address list, index card file, note pad, and form letters. The package does not have a spreadsheet, and its graphics are limited. *Get Organized* is text oriented rather than database or spreadsheet centered, requires an IBM PC with 256K of memory, and will cost $199.

MAINSTREAM PRODUCTS

Framework/*Framework,* from Ashton Tate, was due out in time for this article, but missed its shipping date. This product, which was exhibited at PC Expo, is positioned against *Symphony.* It considers all functions parts of documents and should be taken seriously because Ashton-Tate has developed a large network of applications developers who have

(continued on page S-14)

DIRECTORY OF INTEGRATED SOFTWARE PACKAGES

FEATURES	PRODUCT: Aladin	Aura	Corporate MBA	Electric Desk
Spreadsheet	Y	Y	Y	Y
Word processing	Interface only	Y	Y	Y
Database	Y	Y	Y	Y
Graphics	Y	Y	Y	N
Communications	N	N	Y	Y
Spelling check	N	N	N	N
Price	$595	$495	$895	$345
Minimum memory	128K	256K	384K	256K (IBM PC)
Disk format	5"	5"	8"	Exotic
Copy protected?	No	No	Exotic	Very easy
Documentation (pages)	Excellent			
Menu driven		Yes	Yes	Yes
Recalc 2500 cells	Could not run	1:55	3:08	00:48
Windows	N	2	4	2
Variable width columns		Y (1-35)	Y (3-99)	Y
Data alignment	(The Calc	L R C	L R C	L R C
Log functions	function	3	2	0
Trig functions	was too	7	6	0
Date/Time functions	goofy	7	3	5
Error functions		1	0	N
Financial functions	to answer	1	3	3
IF, THEN		Y	Y	Y
Replicate and copy		Y	Y	Y (very easy)
Text wrap and justify		Y	Kludge	N
Search and replace		Y	N	N
Iteration		Y	N	Y
Macros		Advanced	Advanced	N
Table lookup		Y	Y	N
Word Processing functions	"Bridge" only			
Query capture		Y	N	N
Spawn new documents		N	N	N
Headers and footers		Y	N	Y
Merge print		Y	Y	Y
Document preview		Limited	Y	Y (very)
Footnotes		Y	Y	Y
Typeover and Insert		Y	Y	Y
OK for fast typists?		Y	Y	Very good
Database functions				
Files too large for memory	Y	Y	N	Y
Spreadsheet format	N	In spreadsheet	Y	N
Records per file	65,535	32K+ (est)	999	64,000
Fields per record	512	255	99	48
Max record size	16 are stored	255	1,024	1,000
Number of sort keys	*	9	4	*
Calculated fields	Y	Y	Y	Y
Conditional formatting	N	N	Manual	Y (search key)
Screen generator	Y	Y	Y	Y
Report generator	Y	Y	N	Minimal
Index type	B-Star Plus Tree	B-Tree	None	B-Tree
Graphics Functions				
Move labels	N	Limited	N	None
Bar charts	Y	Y	Y	
Pie charts	N	Y	Y	
3D bar charts	N	Y	N	
Line charts	N	Y	Y	
Customize scales/gridlines	N	(Still buggy)	Y	
Log charts	N	No	N	

Encore!	IBM Assistant	InteSoft	ITSoftware	Jack2	Jane	KnowledgeMan
Y	(due 1985)	InteCalc	Calcit	Y	Y	Y
Limited	Writing Asst	InteWord	Writit	Y	Y	N
Special purpose	Filing/Report	InteBase	Keepit	Y	Y	Y
Y	Graphing Asst.	InteGraph	Showit	Y	N	KGraph/KPaint
N	N	N	Linkit, Passit	N	N	N
N	Y	N	in Writit	N	N	N
$675	$495 each	$295 each	$199, $495 each	$495	$299	$180
256K	128K	192K	256K	256K	64K	128K
Y	Excellent	Y	Y	Y	Automatic loop	Y
Good	N	Not as good	Very good	Good	Very easy	Not tested
Y	Training Aids	Limited	Limited	Y (in Quickstart)	Y	Y
25 line edit		25 line edit	25 line edit	25 line edit	1 line edit	25 line edit
00:21/2,000 cells	(To be released next year)	00:08	00:08	00:10/1,000 cells	(only 70 cells)	Not tested
1		4	4	2	4	N
Y		Y (1–127)	Y	Y	N	Y
None		L R	L R CHor CVer	L R	L R C	?
4		2	3	1	N	3
0		6	8	N	N	Y
9		7	12	3	3	7
3		4	5	N	N	N
2		11	11	7	N	N
1		1	In User cells	0	N	N User Files
Y		Y	Y	Y	Just one page	Y
Y		N	N	N	N	One dumbwaiter
N		N	N	Forms only	N	Y
Y		Y	N	N	N	N
Advanced		Exec functions	Exec	N	N	Y
Y		3 functions	Y (4 functions)	Y	N	Y
(IUCSD editor)	Writing Asst	InteWord	Multiwrite			None
Y	Y	Y	Y	Y	Y	
Y	N	Y	Y	Y	Y	
Y	Y	Y	Y	Y	Typically	
Y	Y	Y	Y	Y	Y	
Pseudo-level	Y	Y	Y (all levels)	Y	Y (power-user)	
N	Y	Y	Y	Y	Minimally	
Y	Y	Y	Y	Y	Y	
N (line editor)	Y	Fair	Y	Y	Probably not	
(Specialized)	Filing Assist	InteBase	Keepit			
N	Y		Y	Y	Not stated	Y
Y	N		N	Possible	N	Optional
Y	Y		Dual User	2-User	Network	2-User
132K	Y (powerful) 128		96	128+	64	256
Y	Not standard	Command	Y	43	Y	As 1-2-3
Y	Y	Use dot commands	Y	Y	Y	Menu-driven
Y	Extra, in memory	Y	Y	Y	N	Y
Advanced	Y		Y	N	N	Y
N	Y		Y	Y	N	Y
Y	Reporting Asst		Y	N	N	Y
None	None		Y unspecified	None	None	B-Plus free
	Graphing Asst	(In InteCalc)	Showit		None	
Y	N	Y	N	Y		Y
Y	Y	Y	Y	Y		Y
Y	Y	Y	Y	N		Y
N	N	N	N	N		Y
Y	Y	Y	Y	Y		Y
Some play	Y classes	Y	Y (some help)	N		Y
HP only	Y classes	Y	All IBM, Decmate	Y		Y

DIRECTORY (CONT'D)

FEATURES	PRODUCT: Office	1-2-3	Peachtext 5000	PractiCalc II
Spreadsheet	N	Y	Y	Y
Word processing	Y	N	Y	Limited
Database	Y	Y	N	N
Graphics	N	Y	Y	Y
Communications	N	N	Y	N
Spelling check	N	N	Y	N
Price	$149	$495	$295	$149.95
Minimum memory	192K	192K	64K	48K
PC required	N	Y	Compatible	N
Copy protected	Yes	Soft	Hard-to-crack	Y
Spreadsheet features				
Matrix format		256 rows/256	63x63	254x127
Fixed, floating cells		Both	Both	Both (fixed only)
Windows		2	2	N
Variable width columns		Y (1-72)	Y (1-99)	Y (1-38)
Data alignment		L R C	L R	L R
Log functions		3	3	2
Trig functions		7	7	4
Statistical functions		9	9	8
User functions		1	1	4
Financial functions		5	5	5
Formula		Y	Y	Y
Relational functions		Y	Only 12 args	Y
Cell view and release		Both	N	Release
Search and replace		Search	N	Search
Itemizer		Y	N	N
Macros		Y	N	N
Table lookup		Y	Y	N
Word Processing Functions				
Word processing		None		Very minimal
User's manual	N		N	Y
Embed text in cell	N		N	Y
Multiple text formats	N		N	N
Merge text	Y		Y	N
Formatted printer	N		Y	N
Form letters	N		Y	N
Typeover and insert	Y		Y	Replace
OK for first typists?	N		Y	N
Database Functions				
Files too large for memory			Key Manager	
Spreadsheet format	Y	N	Y	N
Relational files	N	Y	N	Y
Records per file	Limited RAM	Unspecified	67,665	Memory limit
Fields per record	2500	32,750	16	Limited RAM
Recognizes field	2,500	240	Y	16
Number of field keys	1	15	1	1
Concurrent fields	1	1	1	1
Command language	N	Keyboard macros	N	N
Report generator	Y	N	N	N
Report generator	Y	N	Y	N
Index type		None	None	None
Graphics Functions	None		None	
Move labels		N		N
Use colors		Y		Y
Pie charts		Y		N
XY line charts		Y		N
Line charts		Y		N
Customize graphs to suit?		Limited		N
Storage?		.PIC files		N

Series One Plus	Symphony	[illegible]	[illegible]	[illegible]	Wordstar Millenia
Y	Y	Y	Y	N	Magic Worksheet
Y	Y	Y	Y	Y	Word Right
Y	Y	Y	Y	Y	NAD & Analyst
ExecuPlot	Y	Bar charts	Graphin Calc	N	Y
ExecuLink	Y	N	Promised	ECOM only	N
N	N	Y	N	Y	N
$495 (WP DB S)	$695	$450		$250	$495 (complete)
192K	320K	128K	128K	96K	256K
Y	Y	Y (demo disk)	Y	N	N
Acceptable	Good	Difficult	Y	Easy	Very difficult
ExecuModel				None	Magic Worksheet
256x64	256x8191	50 x (memory)	127x999		64x255
00:55/1,450 cells	00:05/2,125 cells	Could not run	00:40		3:45
2	4	N	2		2 (H or V)
Y (1-72)	Y (1-240)	Y (free form)	Y (2-75)		Y (3-77)
LRC	LRC	LRC	LRC		LRC
3	3	3	0		3
Pi only	7	4	0		7
5	7	4	2		2
0	11	Simulated	0		0
NPV only	5	NPV	2		NPV
Y	Y	Y	Y		N
Y	Y	N	Y		Y
N	Y	Y	N		N
N	Find	Y	Search		N
N	Y	N	N		N
N	Y	N	N		Scripts
N	Y	Simulated	Y		Y
					Word Right
Y	Y	Y	Y	Y	Y
Y	Y	N	Y	N	Y
Y	Y	Y	Y	Footers	Y
Y	Y	Y	NM	Y	Y
Y	Y	Y	Y	Some	Y
Y	Y	Y	N	Y	1 (with NAD)
Line insert	Y	Y	Y	Y	Y
Fair	Y	N (Line editor)	Y	Fair	Could not test
					Analyst
Y	N	Y	N	Y	Y
N	Y	Optional	Y	N	N
Unspecified	8,191	About 800	(Memory size)	(Disk size)	Disk size
35	256	About 20-100	30	250	50
78	239	80	79	76	132 (total 255)
3	3	1	1	9	1
Interpoint only	Y (Wheel mode)	Y	Y	N	Y
N	Y	N	N	N	Script
Y	Y	Uses editor	N	N	N
ExecuReporter	Y	Y	Y	Form Letters	Y
Index file	None	Not specified	None	None	Not mentioned
ExecuPlot			None	None	
N	Y	N			N
Y	Y	Y			Y
Y	Y	N			Y
N	N	N			N
Y	Y	N			Y
Epson only	Y	N			Not described
N	Y	N			HP7470A only

Previews of Coming Attractions (cont'd)

(continued from page S-9)
built applications for *dBase II*. Like *Symphony*, *Framework* will cost $695. *Framework* includes an outline generator that integrates a spreadsheet, forms processing, data management, communications, a word processor, and graphics.

Open Access/*Open Access* is built around a relational database manager using IBM's Structured Query Language. It has five other modules: spreadsheet, graphics, word processing, communications, and time management. The DBMS offers up to 32,000 records with 55 fields and can have five files open at once. It is available for the IBM PC and the Tandy 2000, and requires 192K of memory and two disk drives.

Plan Series/Chang Labs announced *MemoPlan* (word processor), *MicroPlan* (spreadsheet), *FilePlan* (data management), *DocuPlan* (report generator), and *GraphPlan* (Graphics) for the IBM PC, MS-DOS systems, and CP/M systems. These stand-alone packages work in as little as 64K of memory and also work together in an integrated fashion with *LinkPlan*, an integrating environment. The modules cost $195 to $495 each.

Intuit/*Intuit*, from Noumenon, is a $395 package that combines text editing, directory management, database management and spreadsheet. This package is limited in capacity: the database allows up to 65 fields with two sort keys, and the spreadsheet has 200 rows of 65 columns. The "word processing" requires separate parts to enter and format text. *Intuit* requires 256K of memory

Benchmark/ At Comdex, Metasoft Corp. announced their *Benchmark* series, ten integrated packages ranging in price from $49 to $395, with package deals available from $395 to $995. The packages include The Administrator (integrating directory program), Word Processor, Spelling Checker, Telecom, Business Graphics, Presentation Graphics, Financial Planner, Data.

Ovation/*Ovation*, the most preannounced and overhyped software package since *VisiOn*, was originally due this past spring but has been rescheduled for October release. The package claims to work entirely in English with fewer than 30 commands to handle spreadsheets, word processing, graphics, information management, and communications.

SOMETIMES, YOU must read between the lines to discover a flaw in a package.

Changes made to one aspect of a program are to be immediately reflected in all other programs, making the product more closely integrated than its competitors.

Integrated-7/*Integrated-7* is clearly positioned against *Symphony*, with two extra applications for the same price. The extra applications are mainframe electronic mail and DEC VT52/VT100 or IBM 3101 terminal emulation. The word processor includes a spelling checker with a 35,000-word dictionary. Compared to *Symphony*, the package allows only 1/4 as many rows in the spreadsheet but more than 20 times as many records in the database manager, allowing 100,000 records, with 40 fields per record and up to 60 characters per field. *Integrated-7* requires 320K of memory and two drives or a hard drive. The package will sell for $495 until the end of October; then it will be $695.

Knowledge Man/Although we were not able to review *Knowledge Man*, we did have a copy of the tutorial manual, and have listed it in the charts, without the benchmarks.

HEAVY DUTY SUPPLIERS

Goldengate/ Cullinet Software previewed *Goldengate* at the June PC Expo, and scheduled it for fall release. This package is probably a bigger threat to *Symphony* than *Framework*. Cullinet was the first public software company on a major stock exchange and has been producing mainframe database software since 1968. Their IDMS is probably the most widely used database in large companies, and *Goldengate* was designed to tie into the database. The Goldengate programs include a spreadsheet, a local database management system, color business graphics, word processing, electronic mail, directory management, and 3270 communications. Its main attraction is the degree of mainframe to workstation integration, particularly when used with IDMS. The programs require a PC with 256K and at least a 5Mb hard disk. Prices were not available, but indications were that they will start in the $1000s.

20/20/ Another mainframe software supplier producing an integrated package for micros is Access technology. If you are running their SuperComp-Twenty spreadsheet on your IBM mainframe ($9700) or on your Prime, VAX, or Data General ($4800), then you are sure to want *20/20* on your micro to do text processing, spreadsheet modeling, graphics, data management, and scheduling.

CA-Executive/*CA-Executive* has been advertised in business magazines with four-page color ads as available now. Computer Associates is a large software firm with products for mainframes and minicomputers. The package includes CA-Link for mainframe to micro data transfer, CA-Writer for word processing, CA-Graph color business graphics, CA-Tutor training for the system, CA-Calc spreadsheet, CA-DBMS and CA-Form for the database manager, and the CA-Executive window manager to integrate them all. The advertising lists a price of $6500 for five workstations and the mainframe communications link. The system will work in the IBM PC, PC XT, 3270 PC, and XT/370. It links to CA-Universe, their mainframe database manager.

OFF THE BEATEN PATH

DeskMate/ KasTer Corp. has announced a package at the other end of the spectrum from *CA-Executive*. Their integrated MiniCalc, GraphMate, FileMate and NoteBook provide a spreadsheet, graphics, and a database manager for the Casio PB-700 hand held computer. The spreadsheet has 200 cells, and the database can handle 70 records.

MultiSolver/*MultiSolver* is a light duty Basic language program generator aimed at the home and small business. This $295 program lets you specify your own database management (20 fields), bar graphs, budget management (28 budget categories), mailing lists (2200 names) and form letters, word processing, general ledger, checkbook manager, and invoicing programs. If you program in Basic, you can then customize the programs further. A master menu with screen prompts integrates the packages. It requires 128K of memory and two double sided disk drives. ■

Manufacturer Listing

Integrated Software Products and Suppliers

PRODUCT, COMPUTER(S). OPERATING SYSTEMS	COMPANY
Aladin (MS-DOS)	**Advanced Data Institute** 1215 Howe Ave. Sacramento, CA 95825 (916) 925-2229
Appleworks (Apple II)	**Apple Computer** 10260 Bandley Dr. Cupertino, CA 95014 (408) 996-1010
Aura (PC-DOS)	**Softrend** 87 Indianrock Rd. Windham, NH 03087 (603) 898-1777
Benchmark (MS-DOS)	**Metasoft Corp.** 6509 West Frye Rd., Suite 12 Chandler, AZ 85224 (602) 961-0003
CA-Executive (MS-DOS)	**Computer Associates International** 125 Jericho Tpke. Jericho, NY 11753 (800) 653-3003
Canobrain (CP/M 86)	**Canon USA** One Canon Pl. Lake Success, NY 11042 (516) 488-6700
Corporate MBA (MS-DOS)	**Context Management Systems** 23868 Hawthorne Blvd. Torrance, CA 90505 (213) 378-8277
Creative Series (IBM, Commodore, Apple)	**Creative Software** 230 E. Caribbean Dr. Sunnyvale, CA 94089 (408) 745-1655
Desq (MS-DOS)	**Quarterdeck Office Systems** 1918 Main St. Santa Monica, CA 90405 (213) 392-9851
DeskMate (Casio PB-700)	**Kasler Corporation** P.O. Box 117 Alpine, NJ 07620 (201) 784-9430
Electric Desk (MS-DOS)	**Alpha Software Corporation** 30 B St. Burlington, MA 01803 (617) 229-2924
Enable (MS-DOS)	**The Software Group** Northway Ten Industrial Park Ballston Lake, NY 12019 (518) 877-8600
Encore! (IBM UCSD)	**Ferox Microsystems, Inc.** 1701 N. Fort Myer Dr. Arlington, VA 22209 (703) 841-0800
Framework (MS-DOS)	**Ashton-Tate** 10150 West Jefferson Blvd. Culver City, CA 90230 (213) 204-5570
Get Organized (MS-DOS)	**Electronic Arts** 2755 Campus Dr. San Mateo, CA 94403 (415) 571-7171
Goldengate (MS-DOS)	**Cullinet Software, Inc.** 400 Blue Hill Dr. Westwood, MA 02090 (617) 329-7700
IBM Assistant series (MS-DOS)	**IBM Corp.** P.O. Box 1328-S Boca Raton, FL 33432 (800) 447-4700
InteCalc (MS-DOS)	**Schuchardt Software Systems Inc.** 515 Northgate Dr. San Rafael, CA 94903 (415) 492-9330

Manufacturer Listing (cont'd)

PRODUCT, COMPUTER(S), OPERATING SYSTEMS	COMPANY
Integrated-7 (PC-DOS)	**Mosaic Software** 1972 Massachusetts Ave. Cambridge, MA 02140 (617) 491-2434
Intuit (PC-DOS)	**Noumenon** 512 Westline Dr. Alameda, CA 94501 (415) 521-2145
ITSoftware (MS-DOS)	**ITSoftware** PO. Box 2392 Princeton, NJ 08540 (800) 222-0592
Jack2 (IBM UCSD)	**Business Solutions, Inc.** 60 East Main St. Kings Park, NY 11754 (516) 269-1120
Jane (Apple II)	**Arktronics Corp.** PO. Box 4190 Ann Arbor, MI 48106 (313) 769-7253
Knowledge Manager (MS-DOS)	**Micro Data Base Systems** Box 248 Lafayette, IN 47902 (317) 463-2581
MultiSolver (MS-DOS)	**Software Technology for Computers** 153 California St. Newton, MA 02158 (617) 244-2590
Offix (MS-DOS)	**Emerging Technology** 2031 Broadway Boulder, CO 80302 (303) 447-9495
Open Access (MS-DOS)	**Software Products International** 10240 Sorrento Valley Rd. San Diego, CA 92121 (619) 450-1526
Ovation (MS-DOS)	**Ovation Technologies** 770 Dedham St. Canton, MA 02140 (617) 821-1420
Peachtext 5000 (MS-DOS)	**Peachtree Software** 3445 Peachtree Rd., NE Atlanta, GA 30326 (404) 239-3165
PFS Series (MS-DOS)	**Software Publishing Corp.** 1901 Landings Dr. Mountain View, CA 94043 (415) 962-8910
Plan series (MS-DOS, CP/M)	**Chang Labs** 5300 Stevens Creek Blvd. San Jose, CA 95129 (408) 246-8020
Practi-series (MS-DOS)	**Practicorp International, Inc.** The Silk Mill 44 Oak St. Newton Upper Falls, MA 02164 (617) 965-9870
Press'n'Plot (MS-DOS)	**American Programmers Guild** 55 Mill Plain 17-5 Danbury, CT 06811 (203) 794-0396
The Profit Center (PC-DOS)	**Prentice-Hall, Inc.** Dept. GPD Englewood Cliffs, NJ 07632 (201) 592-2704
Series One Plus (MS-DOS)	**Executec Corp.** 12200 Park Central Dr. Dallas, TX 75251 (214) 239-8080
Silicon Office (MS-DOS)	**R & S Micro Services, Inc.** 864 66th Ave. North Minneapolis, MN 55430 (612) 566-7566
Smart (MS-DOS, CP/M 86)	**Innovative Software, Inc.** 9300 West 110th St. #380 Overland Park, KS 66210 (800) GET-SMART
SuperCalc3 (MS-DOS)	**Sorcim Corp.** 2310 Lundy Ave. San Jose, CA 95131 (408) 942-1727
Symphony and 1-2-3 (MS-DOS)	**Lotus Development Corp.** 161 First St. Cambridge, MA 02142 (617) 492-7171
T/Maker III (CP/M, MS-DOS)	**T/Maker Co.** 2115 Landing Dr. Mountain View, CA 94043 (415) 962-0195
Target Financial Modeling (CP/M, MS-DOS)	**Comshare, Inc.** 1935 Cliff Valley Way, Suite 200 Atlanta, GA 30329 (404) 634-9535
III E-Z Pieces (Apple III)	**Haba Systems, Inc.** 15154 Stagg St. Van Nuys, CA 91405 (213) 901-8828
20/20 (MS-DOS)	**Access Technology, Inc.** 6 Pleasant St. South Natick, MA 01760 (617) 655-9191
The Ultimate (MS-DOS)	**Computer Creations** 766 El Camino Real #D San Carlos, CA 94070 (415) 595-4466
Visi-On (MS-DOS)	**VisiCorp** 2895 Zanker Rd. San Jose, CA 95134 (408) 946-9000
Window Master (CP/M 86, MS-DOS)	**Structured Systems Group** 5204 Claremont Ave. Oakland, CA 94618 (415) 547-1567
Windows (MS-DOS)	**Microsoft** 10700 Northup Way Bellevue, WA 98004 (206) 828-8080

SAT isf ACT ion

Score increase performance warranties make KRELL'S SAT* and ACT* Preparation Series the clear choice for those who care about results. *SCL*, Krell's unique **SELF-CUSTOMIZING LOGIC** tailors learning to the needs and progress of each individual student. The *SCL*'s limitless and penetrating instruction library makes our money-back performance warranty unmatchable by imitators.

ACT THE ONLY ACT SERIES WITH A PERFORMANCE WARRANTY!
Coverage of All ACT Topics ★ English Usage ★ Mathematics ★ Social Science ★ Natural Science ★ Unlimited Drill and Practice ★ ACT Format and Difficulty Level ★ Instant Answers and Explanations ★ *SCL* ★ Full Documentation

COMPLETE SERIES (Blue Label) $249.95 WARRANTY ★ 10% OR 10 POINT SCORE INCREASE OR FULL CASH REFUND ★★★★

CONDENSED VERSION (Red Label) $119.95 Covers Math and English Sections

SAT THE ONLY SAT SERIES WITH A PERFORMANCE WARRANTY!
WINNER 1984 OUTSTANDING SOFTWARE AWARD — CREATIVE COMPUTING
Classic Set ★ Provides Complete Coverage ★ Math, Verbal Test of Standard Written English ★ Unlimited Drill and Practice ★ Simulates SAT Exam Format and Difficulty Level ★ Instant Answers and Explanations ★ *SCL* ★ Full Documentation ★ Workbooks Unnecessary!

EXPANDED SERIES (Gold Label) $299.95 WARRANTY ★ 80 POINT SAT SCORE INCREASE OR FULL CASH REFUND. Expanded Vocabulary, Reading Comprehension, Word Relationship, Mathematics, and TSWE Coverage ★★★★

COMPLETE SERIES (Blue Label) $229.95. WARRANTY ★ 50 POINT SAT SCORE INCREASE OR FULL CASH REFUND ★★★★

CONDENSED SERIES (Red Label) $139.95 15 Programs Cover Math and Verbal Sections

Teacher certified NEA

★★★★ INCLUDES A.I. & B.I. OF A. ADEMIC SCHOLARSHIPS by SCHWAB & FEDER

KRELL'S LOGO M.I.T. Authorized Version ★ 4-Disk Set ★ Two Copies of LOGO for Apple II ★ All Utility Programs ★ Sprite Drivers ★ All M.I.T. Demonstration Programs ★ Shape Editor ★ Music Editor ★ 2 Program ALICE IN LOGOLAND Tutorial Series ★ Unlike Imitations KRELL'S LOGO Offers ALL M.I.T. Features and Picture Saving ★ NETWORKING AVAILABLE **SPECTACULAR PRICE — $89.95**
TOP RATED IN INFOWORLD—EXCELLENT IN ALL CATEGORIES! IBM LOGO available

Teacher certified NEA

BEST First Comprehensive INDIVIDUALIZED Instruction ★ Reading, Writing and Mathematics ★ Highly Interactive ★ The Fundamentals ★ Unlimited Practice ★ *SCL* ★ Ideal for Self-Instruction ★ Enriching ★ Profuse Graphics ★ Enthralls and Enlightens

THE LANGUAGE OF MATH. Nine Modules ★ Concepts and Ideas of Mathematics, Numbers, Processes, Geometry, Graphs and Charts, Money Terms, Measurements, Rates and Ratios, Comparative and Descriptive Terms, Dictionary of Mathematical Terms. Ages 9 & up. More than 20 disks!
$49.95 Per Multi-Disk Module; Any Five Modules $199.95, Complete Set $299.95

LINEAR EQUATIONS. How to Use, Build and Solve Them. Ages 9 & up. **Multi-Disk Set $119.95**

OPERATIONS AND PROCESSES. ADVENTURES THAT TEACH ★ Addition, Subtraction, Multiplication, Division, and Exponents. Ages 8 & up. **Multi-Disk Set $169.95**

GRAMMAR, WHAT BIG TEETH YOU HAVE! Comprehensive Instruction in Grammar, Punctuation and English Usage ★ *SCL* ★ Powerful Diagnostic Programs Focus on Problems in Standardized Exams. **COMPLETE MULTI-DISK SET $119.95**

THE DEVIL AND MR. WEBSTER Definitive Vocabulary Building Series ★ 9000 Key Words ★ Word Attack Skills ★ *SCL* ★ Tutoring plus Exciting Game Format ★ Learn the Vocabulary Skills Indispensible for SUCCESS **COMPLETE MULTI-DISK SET $119.95**

GRE ★ GMAT ★ NTE ★ AWARD WINNING GAMES

CALL OR WRITE FOR FREE CATALOG
OUTSIDE N.Y. STATE
800-245-7355
1320 Stony Brook Road, Stony Brook, New York 11790 (516) 751-5139

DEALER INQUIRIES INVITED
N.Y. Residents add sales tax
Payment in U.S. dollars only
Prices slightly higher outside U.S.

KRELL SOFTWARE CORP.

APPLE, ACORN, ATARI, KAYPRO, IBM-PC, IBM-PCjr, C-64, EPSON, TRS-80*

CIRCLE 212 ON READER SERVICE CARD

discwasher®
SpikeMaster™
Surge Suppressor

Superior protection for your electronics

All electronic equipment needs protection. Computers, televisions and audio systems are all damaged by periodic electrical surges in standard wall current.

The Discwasher SpikeMaster is THE superior suppressor to protect your mega-dollars in equipment.

SpikeMaster incorporates these desirable features.

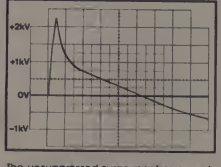
- Multimode suppression systems protect against fast rise time surges, absorbing high power surges quickly.
- Multistage suppression systems guarantee protection whether the "hot" wire, ground wire or both deliver destructive surges.
- RFI filtering isolates your equipment from interfering radio signals on the power line.

The heavy duty Discwasher SpikeMaster is attractively designed for home or office. SpikeMaster incorporates four widely spaced outlets, an on/off switch with indicator light and a 6 1/2 foot power cord.

Independent laboratory tests (to stringent I.E.E.E. standards) confirm that SpikeMaster out performs and out protects suppression devices costing twice as much.

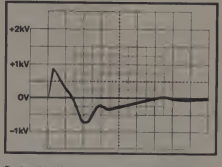
The following oscilloscope tracings measure a 1000 volt surge imposed onto a power line.

Surge



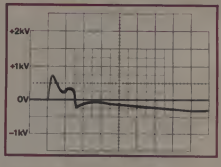
The unsuppressed surge reaches a peak of 2,200 volts.

$150 suppressor



Protection from a unit costing over $150 allows an 870 volt surge through the line with a 750 volt residual surge close behind.

SpikeMaster



SpikeMaster clamps the surge in 30 microseconds. WITH SPIKEMASTER, A LOWER PEAK VOLTAGE AND QUICKER RESPONSE TIME MEANS BETTER PROTECTION FOR ALL YOUR DELICATE ELECTRONIC EQUIPMENT.

discwasher

1407 North Providence Road, P.O. Box 6021, Dept. CC, Columbia, MO 65205 USA A DIVISION OF JENSEN an ESMARK Company

CIRCLE 129 ON READER SERVICE CARD

Structured Programming In Basic

Part 5: Control Structures in ANSI Basic

Arthur Luehrmann

The first three articles in this series [May, June, July, 1984] introduced the main ideas of structured programming: (1) the *top-down method* of planning a program and (2) the use of three types of *formal control blocks* to handle all problems of program logic. These ideas were introduced using the version of Basic available on most personal computers. The fourth article showed how the new ANSI Basic language encourages top-down planning and modular programming. This final article describes the formal control structures which come ready-made in ANSI Basic.

ANSI Basic, Macintosh Basic, True Basic, et al.

As stated in the previous article in this series, microcomputer Basics have been left in the lurch by the past 15 years of advances in the design of programming languages. Since about 1970, nearly all new languages have been based on the concepts of structured programming. Although Pascal is best known, this is also true of C, PL/I, Modula-2, and Ada. But the Basics one finds on nearly all personal computers are relics of a 20-year-old language, the original Dartmouth Basic of 1964. (This historic language is now standardized and has the name Minimal Basic.)

Although microcomputer Basics have remained unchanged, Basic has not. Nearly 15 years ago, Dartmouth Basic added independent subprograms with local variables and a parameter-passing mechanism. About eight years ago, Dartmouth Basic added a full set of control structures, which eliminated the need for using jump statements with line number references—the bane of good programming practice. Unfortunately, all these good developments at Dartmouth went unnoticed by the first developers of microcomputer Basics.

For the past half-dozen years, Committee X3J2 of the American National Standards Institute (ANSI) has been at work developing a draft standard for a modern Basic that includes the above structured programming elements, elaborate file I/O, and device-independent graphics. At this writing, the draft is available for public comment. It things go as expected, a new ANSI standard for Basic will probably become a reality in a year or two.

In the meantime, new commercial products based on the ANSI Basic draft and intended for personal computers should be available by the time this article appears in print. Apple Computer expects its new Macintosh Basic to be in dealers' hands in September. At about the same time, True Basic, Inc., founded by the creators of Basic, John Kemeny and Thomas Kurtz, and a small team of Dartmouth programmers, will deliver an IBM PC version of its product, called True Basic, to Addison Wesley Publishing Company for distribution this fall. A Macintosh version of True Basic will follow shortly thereafter.

The previous article in this series described the elements of ANSI Basic that make top-down design and modular programming attractive and easy to do. The present article discusses the built-in loop and branch control structures that are available to ANSI Basic programmers.

ANSI Basic Loop Blocks

The June and July articles in this series showed how to build loop and branch control structures out of REM, IF, and GOTO statements. A programming example in the July article was a guessing game in which the computer has a secret word and asks the player to guess again and again, receiving hints each time as to whether the secret word is earlier or later in the dictionary than the guess, and stopping when the guess is correct.

The part of the program that asks again and again for guesses is a loop block, of course. In the Minimal Basic version of the guessing game program, the loop looks like this:

```
410 'LOOP
420     PRINT "WHAT'S YOUR GUESS";
430     INPUT G$
440   IF G$ = S$ THEN 500
450     GOSUB 800' HINT
490     GOTO 410
500 'END LOOP
```

In Minimal Basic, the line number references in the IF and GOTO statements are necessary to exit the loop and to continue the loop. ANSI Basic, on the other hand, has a multi-line loop block already built into the language. Here is how one would write this same loop in ANSI Basic:

```
Do
   Print "What's your guess";
   Input guess$
If guess$ = secret$ then exit do
   Call Hint
Loop
```

IBM. Printers/Etc.

IBM PC	CALL
TAVA PC	CALL
TANDON	
TM 100 2 Drives	$198
10MEG Winchester	$1098

IBM ACCESSITES

AST

Combo Plus II 64K	$269
Combo Plus II 128K	CALL
Six Pak Plus 64K	$269
Six Pak Plus 128K	CALL
Mega Plus II 64K	$269
Mega Plus II 64K	$369
Mega Plus II 128K	CALL
I/O Plus II S/C	$119
I/O Plus II S/PC	$149

CCS

SuperVision Board	$595
2 Plus (280 + CPM 2?	$630

HAYES MICROCOMPUTER

Smartmodem 1200B	$419

HERCULES

Hercules Graph Card	$349

KENSINGTON M/W

Modem 1200 PC	$389
PC Saver	$33

MICROSOFT

Mouse	$139
Systemcard 64K	$275
Systemcard 256K	CALL
Ramcard 256K	$325

MOUSE SYSTEMS

PC Mouse W/SW	$109

NOVATION

Access'l 2,3 1200B	$399

PARADISE SYSTEMS

Multi-Display Card	$399

PERSYST

Color Graph Board	$215
Monochrome Board	$229
Multifunction Board	$325

PLANTRONICS

Color Graph Adapter	$395

QUADRAM

Quadlink	$479
Qtr. QBoard (Q RAM)	$210
Exp QBrd (64K SIMM)	$245
Quadcolor I	$215
Quad 512 e (64K)W/S	$249
Quad 512 e (256-512K)	Call

SIGMA DESIGNS

Maximizer 64K S/PC	$267
Floppy Disk Control	$179
10MEG Winchester	$949

TRANSEND

Modem 1200	$459

IBM SOFTWARE

ASHTON TATE

D Base III	$299
Framework	CALL
D Base III	CALL

BPI SYSTEMS

G/L, A/P, A/R, (ea)	$379

CONTINENTAL

Home Account Plus	$99

DAVIDSON & ASSOC.

Mathblaster	$34
Speed Reader II	$40
Word Attack	$34

FUNK SOFTWARE

Sideways	$39

INDIVIDUAL SW

Tutorial Set	$62

INFOCOM

Zork I, II, III (ea)	$27
Deadline	$33
Witness	$33

IUS

EZ Writer I	$159
EZ Writer II	$249

LIFETREE SW

Volkswriter 1 2	$128
Volkswriter Deluxe	$189

LIVING VIDEOTEXT

Think Tank	$128

MICRORIM

R:Base Series 4000	$319
Ext. Report Writer	$99

MICROSOFT

Multiplan	$126
Flight Sim II	$33

MICROSTUF

Crosstalk XVI	$120

MONOGRAM

Inventory & Sales	$109

OPEN SYSTEMS

G/L, A/P, A/R, etc (ea)	$399

PETER NORTON

Norton Utility 2 01	$58

PEOPLESOFT

Prokey	$85

SCELLITE SW

Word Perfect	$255

SIR TECH

Wizardry	$39

SOFTWARE ARTS

TK Solver	$259

SOFTWARE PRODUCTS

Open Access	$369

SOFTWARE PUBLISHING

PFS: Write	$89
PFS: Report	$79
PFS: Graph	$89
PFS: File	$89

STSOFTWARE SYSTEMS

Multimate	$299

STAR SOFTWARE

Accounting Partner	$249

ATARI

400 Keyboard	Call
Bit-3 80 Column	$228

DISK DRIVES

Rana 1000	$298
Astra 2001	$549
Indus GT	$315
Trak AT D2	$388
Trak AT-2	$319
Trak AT-D4	Call
Astra 1620 (Dual)	$499
Percom	Call
Atari 1050	$349

MEMORIES

Microbits 64K (XL)	$115
Mosaic 48K (400)	Call
Mosaic 64K (400/800)	Call
Mosaic 32K	$68

INTERFACES

Axiom 846	Call
Ape Face	Call
Atari 850 (In Stock)	$189
Interfast 1	$109
Microbits 1150	Call
R Verter	Call

DIRECT PRINTERS

Axiom AT 100	$219
Atari 1027	$289
Axiom 550 AT	$319
Axiom 700 AT	$469
Atari 1025	$399

DIRECT MODEMS

Microbits 1000C	$128

COMMODORE

INTERFACES

The Connection	$85
Bus Card	$149
Cardco G +	$89
Cardco B	Call
MSD (IEEE)	$98
Cardco 'I Slot	$48
Grappler C D	$109

DIRECT MODEMS

Hesmodem	$53
1850 Automodem	$99
1600 Modem	Call
Westridge Modem	Call

80 COLUMN BDS

Batteries 80 Col	$149
Video Pak 80	$129

DISK DRIVES

MSD (170K)	$349
MSD Duplex (170K+2)	$539
Laser (170K)	$325
Commodore 1541	$239
Concord (170K)	Call

RECORDERS

Cardco Recorder	$48
1530 Commodore	Call
Cassette Interface	$29
Phoneman Rec	$37

DIRECT PRINTERS

MPS-801	$219
Commodore 1526	$288
Cardco LO/P	$498
1520 Color Printer	$129

CITOH

Prowriter	$335
Prowriter II	$648
Starwriter	$1098
Printmaster	$1448

OKIDATA

82A	Call
84P	Call
92	$409
93	Call

DAISYWRITER

2000	$995

MANNESMANN

160L	$559
Spirit	$309

JUKI

6100	$419

ABATI

LO 20P Tar Quat	$378

PANASONIC

1090	$255
1091	$319
1092	$458

MONITORS

AMDEK

V300 G	$139
V300 A	$149
V310 G (IBM)	$155
V310 A (IBM)	$165
Color I +	$274
Color II +	$419
Color III	$349
Color IV (IBM)	$699

PRINCETON GRAPHICS

MAX 12 (Amber)	$178
HX 12 (RGB)	$489
SR 12 (RGB)	$589

SUPER 5

100A (Amber)	$99
500G (IBM with tilt)	$126
500A (IBM with tilt)	$126

NOVATION

J-Cat	$99
Apple Cat II	$259
D-Cat	$149

SAKATA

SC100 (Color)	$239
SG1000 (Green)	$109

TAXAN

100 Green	$118
105 Amber	$126
210 RGB/Composite	$288
420 RGB Med-Res	$309
415 RGB Hi-Res	$429
420 RGB Hi-Res (IBM)	$479

NEC

JB 1260 (Grn)	$99
JB 1201 (Grn)	$145
JB 1205 (Amber)	$145

ZENITH

Green	$95
Amber	$99

MODEMS

HAYES

Smartmodem 2200	$499
Smartmodem 1200	$498
Micromodem II	$259
Micromodem IIe	$239

PROMETHIUS

Promodem 1200	$349

D = DISK
R = ROM Cartridge
C = CASSETTE

OPEN MON-SAT

COSMIC COMPUTERS

727 BREA CANYON RD., SUITE 16
WALNUT, CA 91789

(800) 626-7642

PLEASE FOR ORDERS ONLY
SORRY, NO COD'S

IN CALIF. (714) 594-5204

FOR TECHNICAL INFO, ORDER INQUIRIES,

Add $2.50 shipping per software order in continental U S. Add $5.00 shipping per software order for AK, HI. FPO. APO. Add $10.00 or 15% (whichever is greater) per software order for non-U S. Call for cost of hardware shipping. Calif. residents add 6½% sales tax. Cashiers checks or money orders filled within 24 hours for items in stock. Personal checks require 4 weeks to clear. MasterCard and Visa OK for software only within continental U S. add 3% surcharge. Include card no. expiration date and signature. Due to our low prices all sales are final. All defective returns must have a return authorization number. Please call to obtain one before returning goods for replacement or repair. Prices & availability subject to change.

apple

APPLE HARDWARE

A.L.S.

CPM Card	$278
Z Card II	$119
Color II	$129
Smartarm II	$129

ALIEN GROUP

Apple Voice Box II	$98
Alan Voice Box	$98

INTERACTIVE STRUC.

Phaso Interface	$127

KENSINGTON

System Saver	$64

KOALA TECHNOLOGIES

Apple Graphic Tablet	$79
Atari Graphic Tablet	$79
C-64 Graphic Tablet	$69

KRAFT

Joystick	$40
Peddles	$35

MICRO-SCI

A2 Drive	$299
A40 Drive	$269

MICROSOFT

Softcard	$228
Softcard Plus	$418
Softcard Premium IIs	$329
Softcard Premium II	$459

ORANGE MICRO

Buffered II+	$115
Buffered Grappler	Call

PARAMETRONICS

Super Fan II	$59

TG PRODUCTS

Joystick Ile w/Toggle	$41
Joystick	$41
Paddles	$29

TYMAC

Printer Interface	$74

SOFTWARE

MISCELLANEOUS

Sideways	$45
Triple Dump	$27
Bruce Lee	$23
Sea Stalker	$27
Dancing Kamungas	$23
Quest	$23
Mastermaker	$45
ASCII Express	$87
Equire	$34
Summsr Games	$27
Chemponship Boxing	$27
War In Russia	$50
Sticky Bear (each)	$27
Millionaire	$20
Pinball Const. Set	$23
Pool 1 5	$23
Bandits	$23
Humen Fly	$21
Master Type	$27
New Step by Step	$57
Ultima	$27
Zoom Graphics	$34

ARTSCI

Megic Window II	$95
Magic Words	$45

ASHTON TATE

D Base II (Req Z-80)	$299

AVANT GARDE

Zero Gray: Pinball	$20
Hi-Res Golf	$20
Hi-Res Secrets	$79

BEAGLE BROS.

Dos Boss	$17
Alpha Plot	$27
Utility City	$20
Tip Disk #	$15
Apple Mechanic	$20
Pronto Dos	$20
Flex Text	$20
Frame Up	$20
Type Faces	$14

BRODERBUND

Benk St. Writer	$45
AE	$23
Serpentins	$23
Choplifter	$23
Arcade Machine	$41

BPI

General Accl.	$275
A/R	$275
A/P	$275

CONTINENTAL

G/L, A/R, A/P or P/R	$159
Property Mgt.	$96
Home Accountant	$48
1st Class Mail	$66

DATASOFT

Zaxxon	$27
Micropanter	$23

DON'T ASK

A.E. (w/DAC)	$79
Wordrace	$21

EDUWARE

Spelling Bee w/Read	$27
Alg. 1, 2, 3 or 4	$27
Rendevous	$27
Prisoner II	$23

HAYDEN SOFTWARE

Sergon II	$25
Pewriter 2 2	$95

INFOCOM

Suspended	$34
Zork I, II or III	$27
Starcross	$27
Deadline	$34

INSOFT

Gretorrh II	$50

LEARNING COMPANY

Juggles Rainbow	$20
Bumble Games	$27
Bumble Plot	$27
Gertrudes Secrets	$30
Gertrudes Puzzles	$30
Rockys Boots	$34

LOTUS

Exec. Brief Sys.	$125

MICROLAB

Miner 2049er	$27
MICROLAB	
Viscalc Ile	$164
Viscalc 3.3	$158

MICROSOFT

Typing Tutor II	$17
Applesoft Compiler	$118
A.L.D.S. (Req Z-80)	$79
Basic Compiler	$239
Softcard Pack	$129
Olympic Decathalon	$20

ON-LINE

The Dictionary	$65
Homework Ltd. Ltr	$27
General Manager II	$145
Screenwriter II	$80
Data Handler	$22
Mystery House	$17
Wiz and Princess	$65
Mausreuder	$23
Frogger	$23
Cannonball Blitz	$23
Screenwriter Prof.	$139

PENGUIN

Graphic Megician	$39
Comic Creation Sys.	$53
Special Effects	$27

QUALITY

Bag of Tricks	$27
Ali Baba & 40 Thieves	$22

SENSIBLE SOFTWARE

Sensible Speller	$79
Super Disk Copy III	$23
Multi Disk Catalog	$17

SILICON VALLEY

Word Handler	$55
List Handler	$59

SIR TECH

Police Artist	$23
Wizardry	$34
Knight Dia	$23

SOFTWARE PUBLISH.

PFS: Report	$79
PFS: Filing	$79
PFS: Graph	$79

SORCIM

Supercalc (Req: Z-80)	$124

SPINNAKER

Delta Drawing	$34
Hey Diddle	$20
Most Amazing Thing	$27
Snooper Troops #1	$29
Snooper Troops #2	$29
Story Machine	$23
Trains	$23

STONEWARE

DB Master Sys. (Prot.)	$118
D B Master	$148
D B Master Util. #1	$84
Graphics Proc. Sys.	$48

STRATEGIC SIMULATIONS

Broadsides (Ea)	$27
Carrier Forces (D)	$39
Computer Leader (D)	$27
Rails West (D)	$27
Battle of Normandie	$27
Germany 1985	$39
Epidemic	$23
Fighter Command	$39
Computer Baseball	$27
Carrier Masters	$27
Guadalcanal	$39
Galactic Gladiators	$27
Rebel on Shiloh	$27
Tigers In Snow	$27
Colonial Balance	$27
Computer Ortbeck	$27

SUBLOGIC

Flight Simulator II (D)	$36
Pinball (CD)	$27
Saturn Navigator	$23

TARRAPIN

Terrapin Logo (64K)	$86

VISICORP

Visicalc Ile	$164
Visicalc 3.3	$158

The keywords Do and Loop mark the beginning and end of the block. The computer processes a loop block by performing the body statements in top to bottom order. Note that the If statement ends with the phrase "exit do." If the condition in the If statement is true, the computer skips to the next statement after the Do/Loop block, thus exiting the loop. If the condition is false, the computer continues to perform statements until it reaches the Loop statement. Then the computer jumps back to the beginning of the loop automatically. The process continues until the exit condition becomes true.

A small change in this program will bring out another point about the Do/Loop block. Suppose you wanted the program to begin with the prompt "What's your first guess?" and after that switch to "Next guess?" for the rest of the prompts. Here is one way to do that:

```
Input "What's your first guess?"; guess$
Do
If guess$ = secret$ then exit do
  Call Hint
  Input "Next guess?"; guess$
Loop
```

The Input statement in ANSI Basic allows a user-defined prompt string to substitute for the built-in question mark prompt. The first Input statement is outside the loop; so the first action inside the loop is to see whether or not the guess was correct. Whenever the exit test occurs at the beginning of a loop, ANSI Basic allows this abbreviation:

```
Input "What's your first guess?"; guess$
Do until guess$ = secret$
  Call Hint
  Input "Next guess?"; guess$
Loop
```

Or else this:

```
Input "What's your first guess?"; guess$
Do while guess$ <> secret$
  Call Hint
  Input "Next guess?";guess$
Loop
```

Note that all three versions of this new loop have exactly the same meaning. In every case, the exit test is performed before any body statements are performed. The phrases "until . . . " and "while . . . " may also be appended to the Loop statement when the exit test is to be performed after all the body statements are performed at least once. (Pascal programmers will recognize that these two abbreviations give the Basic programmer the equivalent of the While and the Repeat statements.)

Whether to use these abbreviations is a matter of taste. I prefer to write the exit test explicitly as an If statement, since it seems clearer to me that the test is to be performed at that particular point in the loop. Words like while and until are vague about the time that the test is to happen. Furthermore, during program development it often happens that the exit test migrates around inside the loop. Sometimes it is at the top, sometimes in the middle, sometimes at the bottom. Making such changes is easier if the exit test is on a line by itself and not combined with the Do or Loop lines.

A final point about the Do/Loop block: It is perfectly legal in ANSI Basic for a loop to have more than one exit test. One can have, for example, a while . . . phrase on the Do line, and until . . . phrase on the Loop line, and three If lines with "exit do" phrases. In fact, "exit do" is a statement in its own right and can go anywhere inside a loop. Although legal, these are horrible practices and should be avoided. Loops with multiple or complex exits are unreadable. (I tried to convince my X3J2 colleagues of this, but it was too late in the day.)

ANSI Basic Branch Blocks

The two most important multi-line control blocks in any programming language are loop blocks and branch blocks. They are the backbone of structured programming. The HINT subroutine in the Minimal Basic version of the guessing game program contains a branch block built from REM, IF, and GOTO statements. Here is how it looks:

```
810 IF S$ < G$ THEN 850
820   'FALSE
830     PRINT "LATER THAN"; G$
840     GOTO 870
850   'TRUE
860     PRINT "EARLIER THAN"; G$
870 'END IF
```

The line number references in the IF and GOTO statements are necessary, first to cause the branch to occur and second to skip over the true branch if the condition was false. ANSI Basic offers a ready-made branch block that needs no line number references. Here is the same branch in ANSI Basic:

```
If secret$ < guess$ then
     Print "Earlier than";guess$
Else
     Print "Later than";guess$
End if
```

The main difference here is in the order of the cases: The true case comes first and the false case is second. However, the meaning of both versions is the same. The computer is to test whether the secret word is less than the guess and then either print one hint or the other one.

In ANSI Basic, a branch block begins with an If statement that ends with the word then. The block ends with an End if statement. The Else statement is optional. The computer begins processing the block by evaluating the condition in the If statement. If it is true, the computer performs the statement or statements between the If statement and the Else statement. If the condition is false, the computer performs the statements between the Else and the End-if statements. (If there is no Else statement and the condition is false, the computer simply skips to the next statement after the entire block.)

Multiway Branches

The famous Boehm and Jacopini theorem of 1966 assures us that all problems in program logic can be handled by means of only two control structures: a loop block and a branch block. If ANSI Basic offered only the Do/Loop and the If/End-if blocks, therefore, it would give us all the tools necessary for avoiding the wild jumps that make programs hard to read.

In fact, ANSI Basic goes a step further. It gives additional control structures that add greatly to the readability of programs. Essentially, these are not new blocks. Rather, they are just abbreviations for certain commonly occurring situations in which one branch block is nested inside another one.

Suppose, for example, that a program has just received a one-character string input from a user. The program must detect and do different things, depending upon whether the character is a lowercase letter, an uppercase letter, a numeric digit, a plus or minus sign, or anything else. Here is how one might use the two-way branch block to construct the needed five-way branch:

```
Input a$
If "a" <= a$ and a$ <= "z" then
  Call Lowercase
Else
  If "A" <= a$ and a$ <= "Z" then
    Call Uppercase
  Else
    If "0" <= a$ and a$ <= "9" then
      Call Digit
    Else
      If a$ ="+" or a$ = "-" then
        Call Sign
      Else
        Call OtherChar
      End if
    End if
  End if
End if
```

This structure does the job by nesting block inside of block inside of block, and so on. The outermost block is a single two-way branch. However, another completed two-way branch is nested inside the Else part of the outer branch. Furthermore, the Else part of this inner branch contains yet another complete branch block. Finally, four levels deep, there is still another branch block.

Such a structure works, but it is very hard to make sense of. The four End-if lines are especially troublesome. Do we have the right number? Does each one match up with a corresponding If line? It takes close inspection to answer these questions. To make nested Ifs more legible, ANSI Basic allows the following abbreviation of the above five-way branch:

```
Input a$
If "a" <= a$ and a$ <= "z" then
  Call Lowercase
Else If "A" <= a$ and a$ <= "z" then
  Call Uppercase
Else If "0" <= a$ and a$ <= "9" then
  Call Digit
Else If a$ = "+" or a$ = "-" then
  Call Sign
Else
  Call OtherChar
End if
```

Each Else line in the first version is combined with the If line that follows the Else. Furthermore, a single End-if line closes the entire block. The result is both shorter and far easier to read. However, it has exactly the same meaning as the longer version: the conditions in each If line are tested in order until one is found to be true. If none is true, the last Else part is performed.

ANSI Basic offers still another way to write a multiway branch block like this one. Here it is:

```
Input a$
Select case a$
  Case "a" to "z"
    Call Lowercase
  Case "A" to "Z"
    Call Uppercase
  Case "0" to "9"
    Call Digit
  Case "+", "-"
    Call Sign
  Case Else
    Call OtherChar
End Select
```

Again, this version has exactly the same meaning as the two previous ones. The computer performs a Select block by first evaluating the expression after the word Case in the Select line. Then it searches, from the top, for the first case that matches the value of the expression. The first three cases here are ranges. That is, if the string value of a$ is greater or equal to "a" and less than or equal to "z," the computer will perform the first case. Otherwise it will try the second case, and so on. If no match is found and if there is a Case-else statement, that case is the one performed by the computer. If there is no Case-else statement, control passes to the first statement after the Select block.

Note that the fourth case is a list of possible matches. This case will be performed if the value of a$ is either "+" or "-." In general, items in a Case statement may consist of one or more constants or ranges of constants. Constants and ranges may be combined in a single Case statement. Commas separate constants or ranges from one another. It is also possible to have open-ended ranges. For example, the following Select block will tell whether a number is positive, negative, or zero. The phrases "is > 0" and "is < 0" are examples of open-ended ranges.

```
Select case number
  Case is > 0
    Print "Positive"
  Case is < 0
    Print "Negative"
  Case else
    Print "Zero"
End select
```


Get system control and protection...

Activate your entire system — instantly or in sequence — from the MACC desktop surge protected Master AC Control Console.

• Unique 3-stage transient protection circuitry provides differential and common mode protection. Heavy spike discharge capability allows severe environment operation. Resettable circuit breaker provides additional protection.
• Control circuitry provides both single-switch master control and individual circuit control. One outlet is always "hot" for continuous power. Lighted rocker switches indicate status. No more reaching around, under or behind to turn equipment on and off.
• 125 VAC, 60 Hz, 15 A, 1875 watts total rating. 6000 volt, 2000 amp surge rating. Tested to IEEE pulse standards. Available at your Alpha Delta dealer or direct with $4.00 shipping and handling charge.

ALPHA DELTA MACC-8 (Master Control with 8 outlets) $79.95 (U.S.)

ALPHA DELTA MACC-4 (Master Control with 4 outlets) $59.95 (U.S.)

ALPHA DELTA COMMUNICATIONS, INC.

P.O. Box 571, Centerville, Ohio 45459 • (513) 435-4772

CIRCLE 102 ON READER SERVICE CARD

2-11

"MANAGING YOUR MONEY™ is, simply, the finest personal financial management program on the market."

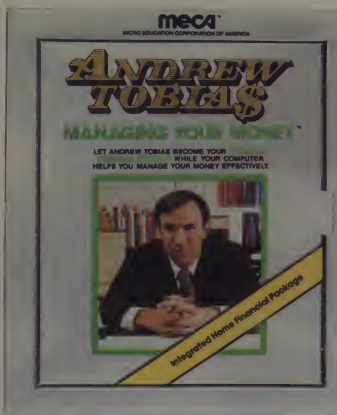
PERSONAL SOFTWARE MAGAZINE, JULY, 1984

"The first fully-integrated financial program that really makes a computer for the home worth the money."

SEYMOUR MERRIN
COMPUTER WORKS OF CT

"MANAGING YOUR MONEY is the most complete home finance package I've seen. It's also about the most easy-to-use software package I've ever encountered."

KEN USTON'S ILLUSTRATED GUIDE TO THE IBM PC


meca
MICRO EDUCATION CORPORATION OF AMERICA
ANDREW TOBIAS
MANAGING YOUR MONEY™
LET ANDREW TOBIAS BECOME YOUR WHILE YOUR COMPUTER HELPS YOU MANAGE YOUR MONEY EFFECTIVELY.
Integrated Home Financial Package

Q+A version for IBM PC XT format and now for PCjr with 256K Cartridge version available for PCjr at IBM authorized dealers

Andrew *Tobias'* new program "can explain the most complex personal financial dilemmas with impressive clarity and frequent twists of wit."

FORBES,
APRIL 9, 1984

"You'd expect MANAGING YOUR MONEY to be difficult to use and full of financial jargon. It isn't."

COMPUTE'S PC & PCjr,
MAY, 1984

The only financial software you'll ever need. The easiest financial software you'll ever use.
It's seven programs in one. It prepares your budget and balances your checkbook. It calculates your net worth. It helps manage your stock portfolio. It calculates your taxes. It estimates your life insurance needs. It analyzes loans and helps you do retirement planning. It reminds you of important dates. No need for a big, bulky manual. With MANAGING YOUR MONEY™ all the help you need is constantly on-line, on the computer. And everything is integrated so you only need to enter data once.

Other fine software products from MECA

For Atari, Apple and IBM — For IBM

Available where fine software is sold

meca™

Software that makes your personal computer worth having.™

©1984 • MICRO EDUCATION CORPORATION OF AMERICA • 285 RIVERSIDE AVENUE WESTPORT CT 06880 • (203) 222-1000

CIRCLE 157 ON READER SERVICE CARD

The new IBM DisplayWrite

Little Tramp character licensed by Bubbles Inc. s.a

*Prices apply at IBM Product Centers and may vary at other stores

**Available in July, 1984

Series is here. Spread the word.

In 1980, IBM introduced the Displaywriter System. Today, it's become the best-selling stand-alone text processor in the world. One reason for this success is the Displaywriter's function-rich software.

If you're looking for software like that, but working on an IBM personal computer, you don't have to look any further. Because the IBM DisplayWrite Series is here.

And it will put many of the features and capabilities of a dedicated word processor to work for you when you're writing.

It runs in the family.

You'll find two word processing programs in this series: There's DisplayWrite 1, for IBM personal computers—including PC*jr*. And DisplayWrite 2, with added functions for your PC, PC/XT or *Portable* PC.

You'll also find DisplayWrite Legal, a dictionary of about 16,000 words that a lawyer might need to check.

And you'll find DisplayComm, which lets your IBM PC send and receive text to and from other IBM PCs. If you're writing at the office, this program could also let you send text to an IBM Displaywriter down the hall. (From there, it could be sent on to an IBM host computer for distribution.)

Some words on high function.

The DisplayWrite word processing programs give you the time-saving features you'd expect from IBM. Justified margins, centered lines and pagination, for example. You'll even have prompts and messages to help guide you along.

But there are also some features in DisplayWrite 2 you might not expect. Like easy column formatting, four-function math capability *plus* a spelling checker based on a dictionary of about 100,000 words.

Yet the biggest surprise of all may be the price.* DisplayWrite 1,** $95. DisplayWrite 2, $299. DisplayWrite Legal, $165. DisplayComm, $375.

Where you can find all four.

Get more information about the IBM DisplayWrite Series at your authorized IBM Personal Computer dealer or IBM Product Center. To find one near you, call 800-447-4700. In Alaska or Hawaii, 800-447-0890.

Stop there first and get the last word.

IBM

Personal Computer Software

CIRCLE 149 ON READER SERVICE CARD

NOAH WEBSTER, MEET YOUR MATCH.

A few months ago, Jennifer would rather go to the dentist than do her spelling homework.

Then Mom bought *Crypto Cube*™ by DesignWare.® Now Jennifer has become an absolute word fiend.

She started off working her way through the many three-dimensional word puzzles that come with the game. Then, she entered her own spelling homework into the program to create new puzzles.

Now Jennifer's making up word puzzles to stump her parents!

DESIGNWARE MAKES LEARNING COME ALIVE.

All DesignWare spelling programs combine computer game fun with sound educational principles to help improve your youngster's spelling skills. *Crypto Cube*, in fact, has just been selected by LEARNING magazine as one of the year's outstanding educational software products. You'll also want to keep an eye out for our new math and science games.

All DesignWare programs run on these computers with disk drive: Apple,® Atari,® Commodore 64,™ IBM PC and IBM PCjr. See your local software retailer or call DesignWare at (800) 572-7767 (in California 415-546-1866) for our free software catalog. You'll be delighted with the way your kids will learn with DesignWare.

DesignWare™

LEARNING COMES ALIVE.

CIRCLE 128 ON READER SERVICE CARD

Again, it is worth pointing out that there is nothing that can be written in the form of a Select block that cannot also be handled with nested two-way If blocks. That, however, is an academic point. The truth is that any multi-way branch that can be put in the form of Select block is vastly more readable that way. (Unfortunately, not all multi-way branches can be recast as Select blocks.)

A Final Example

Perhaps the best way to wrap up this series on structured programming in Basic is to look at an example written originally in a highly unstructured way in Minimal Basic, and then to look at the same program in ANSI Basic. The problem is this: to write a program that simulates a dice game for a thousand rounds and then reports the number of wins and losses.

Any multi-way branch that can be put in the form of a Select block is vastly more readable that way.

In the standard dice game, the player wins on the first roll if it is a 7 or 11. The player loses if the first roll is 2, 3, or 12. If the first roll is anything else, that becomes the player's point. The round continues with more rolls until the player rolls the point (a win) or a 7 (a loss).

Here is how one might write such a program in Minimal Basic without any effort to structure the program:

```
100 DEF FNR = INT(6 RND) + INT(6* RND) + 2
110 LET W = 0
120 LET L = 0
130 RANDOMIZE
140 FOR J = 1 TO 1000
150 LET F = FNR
160 IF F = 7 OR F = 11 THEN 230
170 IF F = 2 OR F = 3 OR F = 12 THEN 250
180 LET P = F
190 LET N = FNR
200 IF N = P THEN 230
210 IF N = 7 THEN 250
220 GOTO 190
230 LET W = W + 1
240 GOTO 260
250 LET L = L + 1
260 NEXT J
270 PRINT "WINS = "; W
280 PRINT "LOSSES = "; L
290 PRINT "% WINS" =":100 * W / (W + L)
300 END
```

Now let's see how to solve the same programming problem by using the principles of structured programming and the elements of ANSI Basic. We begin with an outline of the main parts of the program:

```
Program DiceGame
  initialize variables
  For j = 1 to 1000
    play one round
  Next j
  print statistics
End
```

The next step is to translate the English phrases into Basic. As usual, the best approach is to substitute calls to procedures and then create skeleton procedures for debugging purposes. Since the whole program will be fairly short, we choose to use internal procedures. Here is the next phase of the program development:

```
Program DiceGame
  Call Initialize
  For j = 1 to 1000
    Call OneRound
  Next j
  Call Statistics

  Sub Intialize
    Print "Initialize"
  End sub

  Sub OneRound
    Print "OneRound"
  End Sub

  Sub Statistics
    Print "Statistics"
  End sub
End
```

The next step is to flesh out the body of the three subprograms. The first is easy. The program must keep track of wins and losses, so there are two variables to be initialized to zero. In addition, the random number function needs to be reseeded. Here is subprogram Initialize:

```
Sub Intialize
  Let wins = 0
  Let losses = 0
  Randomize
End sub
```

Next comes the subprogram to play a single round in the series of dice games. The round begins with a single roll of the dice. After that there are three cases: a win on 7 or 11, a loss on 2, 3, or 12, and more rolls on any other point. Here is an outline of subprogram OneRound:

```
Sub OneRound
  roll dice; value = firstroll
  Select case firstroll
    Case 7, 11
      count it a win
    Case 2, 3, 12
      count it a loss
    Case else
      roll some more
  End select
End sub
```

The Select block is a convenient one to use here for the three cases possible in the dice game. The next step is to convert the English phrases into Basic statements. Since the dice roll will be needed in two different places, it is a good idea to make it into a separate function, which we shall call Roll.

The next two phrases are easy to handle with single Let statements. The phrase "roll some more" will contain numerous details about subsequent rolls, so it is best to replace the phrase by a Call statement to a new subprogram. Here is the next phase of development:

```
Sub OneRound
  Let firstroll = Roll
  Select case firstroll
    Case 7, 11
      Let wins = wins + 1
    Case 2, 3, 12
      Let losses = + 1
    Case else
      Call RollAgain
  End select
End sub
```

Before getting bogged down in the details of function Roll and subprogram RollAgain, it is a good idea to finish the original three subprograms. The Statistics subprogram still needs fleshing out. Since it will contain nothing but Print statements, we might as well skip the outline stage. Here is the finished subprogram:

```
Sub Statistics
  Print "Wins ="; wins
  Print "Losses ="; losses
  Print "% Wins ="; 100 * wins / (wins + losses)
End sub
```

Having finished the three original subprograms, it is time to turn attention to function Roll and subprogram RollAgain. The function is quite straightforward, given an understanding of the way the built-in rnd and int functions work. Here it is:

```
Function Roll
  Let Roll = int(6 * rnd) + int(6 * rnd) + 2
End function '
```

Subprogram RollAgain is a good deal more complex. First, it must remember the first roll as the "point" to be made. Next it must use a loop block to roll the dice again and again until either the point is made or the roll is 7. Finally, it must use a branch block to increment either the wins counter or the losses counter, depending on whether or not the point was made. Here is an outline of the subprogram:

```
Sub RollAgain
  Save first roll as point
  Do
    Roll dice
  If roll is point or 7 then exit do
  Loop
  If roll is point then
    Count it a win
  Else
    Count it a loss
  End if
End sub
```

Each phrase above is easily translated into simple Basic statements or calls to procedures already defined. Here is the final version of RollAgain:

```
Sub RollAgain
  Let point = first
  Do
    Let next = Roll
  If next = point or next = 7 then exit do
  Loop
  If next = point then
    Let wins = wins + 1
  Else
    Let losses = losses + 1
  End if
End sub
```

Notice that the Do/Loop block keeps on rolling the dice until the roll is equal to the point or to 7. Once the loop block is finished, a branch block decides whether to increment the wins counter or the losses counter.

The preceding subroutine completes the list of tasks remaining to be done. The dice game program is now complete. Here is the whole program as it might be written in ANSI Basic:

```
Program DiceGame
  Call Initialize
  For i = 1 to 1000
    Call OneRound
  Next i
  Call Statistics

  Sub Intialize
    Let wins = 0
    Let losses = 0
    Randomize
End sub

Sub OneRound
  Let firstroll = Roll
  Select case firstroll
    Case 7, 11
      Let wins = wins + 1
    Case 2, 3, 12
      Let losses = losses + 1
    Case else
      Call RollAgain
  End select
End sub

Sub Statistics
  Print "Wins ="; wins
  Print "Losses ="; losses
  Print "% Wins ="; 100 * wins / (wins
   + losses)
End sub

Function Roll
  Let Roll = int(6 * rnd) + int(6 * rnd) + 2
End function

Sub RollAgain
  Let point = first
  Do
    Let next = Roll
  If next = point or next = 7 then exit do
  Loop
  If next = point then
    Let wins = wins + 1
  Else
    Let losses = losses + 1
  End if
 End sub
End
```

This simple program displays both top-down organization and the use of formal control structures to handle all logical problems. Since ANSI Basic has all these program structuring tools built in, the programmer's job is a good deal simpler than it would be when using Minimal Basic.

A Final Thought

As ANSI Basic becomes available more widely on personal computers, increasing numbers of people may discover the advantages of thinking about programming as an orderly, constructive design process and not just a brute force effort to get the thing to work. Perhaps . . . just perhaps . . . it may turn out that Basic programmers will no longer deserve the reputation of being, in Professor Dijkstra's phrase, "mentally mutilated beyond the hope of regeneration." ■

A Calculus Game

Following the path of a parabola in a stepwise progression can lead to some amazing patterns— almost like a hall of mirrors.

Neil M. Wigley

What happens if you keep repeating something? If you poke your sister in the arm enough times, she'll whack you. If you make enough obscene telephone calls to your neighbor, the police will surely get you. What if you apply a function y = f(x) (straight out of elementary calculus) to a number x, and get a number y; and then you apply f to y and get a new number f(f(x)) = f(y) and then you do the same thing again and again?

The educational value of this game is a simple example of nonlinearity, a subject which is just beginning to earn some attention in the mathematical community.

It is not an easy problem to solve mathematically, except in certain special cases; for example, if f(x) ≥ x always, then our numbers will get bigger and bigger. They may go off to infinity or they may slow down (converge) somewhere before.

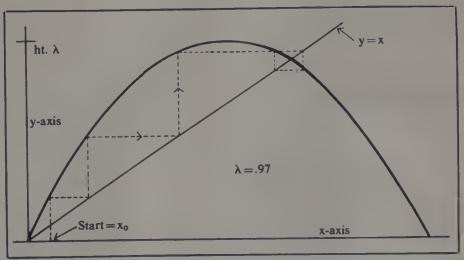


Figure 1.

Here we shall consider an elementary example which exhibits some rather exotic behavior. I first learned of this example in *Scientific American* [1].

In Figure 1 we see a parabola and the diagonal line y = x. The height of the parabola is λ, where λ is a number between 0 and 1; later we shall vary λ.

We start with a value of x, call it x_0. Geometrically, what we do is start on the x-axis at x_0, go up to the parabola, go to the right (left) till the diagonal line, then go up (down) to the parabola, then right (left) to the line, etc. The moving point thus describes a rectangular path. It is the shape of this path which can be so fascinating.

For small values of λ (less than .75) the point describes a sequence of (almost) rectangles which get smaller and smaller, converging on a point (the point where the line crosses the parabola). For larger values of λ, the behavior of the path is chaotic; and for values of λ in between the behavior is, likewise, in between: not chaotic, but not as well organized as for small λ.

The educational value of this game is a simple example of nonlinearity, a subject which is just beginning to earn some attention in the mathematical community. Thus observance of the paths described above can give a rudimentary view of a simple, yet chaotic, nonlinearity.

Let us now do some algebra, and find the equations we want to satisfy, so that we can write a program. We need the

equation of the parabola. We want the parabola which opens down, goes through the points (0,0) and (1,0) on the x-axis, and has maximum height λ above the point (.5,0) on the x-axis. We shall vary λ later, but we insist that $0 \leq \lambda \leq 1$. It should not be a surprise that the equation is

$$y = 4\lambda x(1-x)$$

which is obviously a parabola and gives $y = 0$ when $x = 0$ or 1, and, when $x = .5$, we see that $y = \lambda$. This parabola also opens down, as desired.

Notice that when $0 \leq x \leq 1$, we have $0 \leq y \leq 1$, so that y can't go leaping off to infinity. Moreover, f(y) is defined, and thus so is f(f(y)). We have thus defined a sequence, and maybe it will converge. The problem now is to compute what happens to an initial value of x, say x_0, which we call the *seed*, after it has been hit with f through $x_1 = f(x_0)$, $x_2 = f(x_1)$, etc.

It would be boring and time-consuming to calculate these numbers and compare them after, say, 100 iterations. Let's try using the monitor to see if it can help us.

To see if what is happening on screen agrees with the algebra, we notice that any point on the diagonal line must be of the form (x,x), since y = x there. So we start with a seed x_0 which we place at $(x_0,0)$ on the x-axis. Then we go straight up to the parabola and meet it at a point with the same abscissa x_0 and with ordinate y where $y = f(x_0)$, which we call x_1. To the right (or left) of this point is the point (y,y), which shares the same ordinate (height) and lies on the diagonal line. This point will have the same x-coordinate as it does y-coordinate, and the latter is the same as $x_1 = y = f(x_0)$. Therefore this point will have coordinates (x_1,x_1).

Now we begin our loop. From here we go up (down) to the parabola, then over to the line, and now repeat. Thus it is curve-line-curve-line, etc. As the point moves on, it traces rectangular shapes, two of whose vertices are on the diagonal line.

The question now is what happens to these two vertices on the line after a million iterations. And the results are surprising: it depends a great deal on λ! If λ is small (λ ≤ .75) then things are boring; if λ is greater than .75, things get exciting, and when λ gets near enough to 1 things get absolutely chaotic! Around λ = .8 there are some rather interesting patterns: rectangles within rectangles—like a hall of mirrors.

More mathematical details are available in the excellent article by Hofstadter. One new result is the existence of certain constants which *seem* to depend on the function (in our case, the parabola), but which in fact don't change if you change the function (e.g., a sine wave). These are called universal constants.

Listing 1 is the program as written for an Apple II+. Lines 2 to 100 are subroutines. In lines 1010 to 1030 we define screen coordinates. Then the program begins, with the user selecting one of three functions, one of which is the parabola. Lines 1120 to 1210 plot the curve and the vertical line above the seed. Lines 1250-1310 represent the main do-loop. The menu begins on line 1320 and continues through line 1410.

On the menu are options: select a new lambda or new seed, change the function or quit, clear the screen (which could better have been called erase), and "enlarge," which is an attempt at magnification of the picture when the details get too small. It is with this feature that you can get the rectangles-within-rectangles patterns.

For a universal constant with *your* name on it, just copy the program, run it, and follow the dot. Happy staring! ■

Listing 1.

```
1  FOR I = 768 TO 777: READ J: POKE
     I,J: NEXT : HOME : TEXT : GOTO
     1010: REM  CC1AM
2  PRINT "LAMBDA="L", SEED="S", O
     LD L = "OL: PRINT "OLD SEED=
     "OS"  SP-BAR FOR MENU": RETURN

3  POKE  - 16368,0: POKE  - 16368
     ,0: RETURN
4  C$(1) = "F. CHANGE F(X)": C$(2) =
     "L. CHANGE LAMBDA": C$(3) = "
     S. CHANGE SEED": C$(4) = "Q.
     QUIT": C$(5) = "C. CLEAR SCRE
     EN": C$(6) = "E. ENLARGE SCRE
     EN": RETURN
5  YP = 279 * ((X - A) ^ (B - A));
     YP = 159 * (1 - (Y - A) ^ (B
     - A)): RETURN
97  DEF  FN F(X) = 4 * L * X * (1
     - X): RETURN
98  DEF  FN G(X) = 4 * L * X * (1
     - X): DEF  FN F(X) = FN G(
     FN G(X)): RETURN
99 PI = 3.1415926454: DEF  FN F(X)
     = L *  SIN (X * PI): RETURN

100  FOR J = 1 TO 9: L(J) = L(J +
     1): NEXT : NL = NL - 1: RETURN

1010  DEF  FN SX(X) = 279 * X
1020  DEF  FN SY(X) = 159 * (1 -
     X)

1030  DEF  FN XL(YP) = 279 - YP *
     (279 / 159)
1050  PRINT : PRINT : PRINT "WHAT FCT?"
1060  P$(1) = "PARABOLA": P$(2) = "
     QUARTIC": P$(3) = "SIN(X*PI)"

1070  FOR I = 1 TO 3: PRINT  TAB(
     9)I". "P$(I): NEXT
1080  GET K: ON K GOSUB 97,98,99
1090  IF  ABS (K - I) > 1 THEN 10
     70
1100  INPUT "NEW LAMBDA=? ";L
1110  INPUT "NEW SEED=? ";S
1120  TEXT : HGR : HCOLOR= 3: REM
     HPLOT CURVE
1130  GOSUB 2:OS = S
1140  FOR I = 0 TO 279
1150 Y =  FN F(I / 279)
1160 YP =  FN SY(Y)
1170  HPLOT 1,YP: NEXT
1180  HPLOT 279,0 TO 0,159
1190 Y =  FN F(S):YP =  FN SY(Y)
1200 XP =  FN SX(S):X = S
1210  HPLOT X,159 TO XP,YP
1230  REM  CURVE,LINE,CURVE
1250 XP =  FN SX(X):YP =  FN SY(Y
     )
1260 XL =  FN XL(YP):YO = YP

1270  HPLOT XP,YP TO XL,YP
1280 X = Y:Y =  FN F(X)
1290 YP =  FN SY(Y)
1300  HPLOT XL,YO TO XL,YP
1310  IF  PEEK ( - 16384) < 128
     0 THEN 1250
1320  GOSUB 3: TEXT : HOME
1330  GOSUB 4: PRINT  TAB( 13)"SE
     LECT FROM:"
1340  PRINT : FOR I = 1 TO 6: PRINT
      TAB( 9)C$(I): NEXT
1350  PRINT : PRINT  TAB( 9)"LAMD
     A="L",SEED="S: GET C$
1360  IF C$ = "Q" THEN  TEXT : HOME
     : END
1370  IF C$ = "S" THEN 1110
1380  IF C$ = "C" THEN  TEXT : HGR
     : GOSUB 2: GOTO 1230
1390  IF C$ = "F" THEN 1050
1400  IF C$ = "E" THEN 1600
1410  IF C$ < > "L" THEN 1320
1420 NL = NL + 1: IF NL = 10 THEN
      GOSUB 100
1430 L(NL) = L: FOR I = 1 TO NL
1440  PRINT  TAB( 10)"LAMBDA("I")
     ="L(I)
1450  NEXT :OL = L: PRINT
1460  INPUT "NEW LAMBDA=?";L
1470  PRINT "WANT NEW SEED?(Y/N)"

1480  GET C$: IF C$ = "Y" THEN  PRINT
      "OLD SEED = "S: GOTO 1110
1490  IF C$ > < "N" THEN 1470
1500  GOTO 1120
1600  TEXT : HGR : HCOLOR= 3
1610 A = 1:B = 0: GOSUB 3
1620  FOR I = 1 TO 20:Y =  FN F(X
     )
1630  IF A > X THEN A = X
1632  IF B < X THEN B = X
1640 X = Y: NEXT :Y =  FN F(X)
1650 AB = .5 * (1 + A / B):A = AB
     * A
1660  PRINT "A="A",B-A="B - A",LA
     MBDA="L",SEED="S
1670  GOSUB 5: IF B - A < 10 ^ -
     9 THEN  PRINT "UNDERFLOW. HI
     T ANY KEY": GET C$: GOTO 132
     0
1680 XL =  FN XL(YP): POKE 216,0
1690  ONERR  GOTO 1920
1700  HPLOT XP,YP TO XL,YP
1710 X =  FN F(X):Y =  FN F(X)
1720 YL = YP: GOSUB 5
1730  HPLOT XL,YL TO XL,YP
1740  IF  PEEK ( - 16384) < 128
     0 THEN 1680
1750  GOTO 1320
1920  CALL 768: GOTO 1320
9998  DATA 104,168,104,166,223
9999  DATA 154,72,152,72,96
```

Reference

1. Douglas R. Hofstadter. *Scientific American*, November 1983, "Metamagical Themas."

Trusted by Accounting Professionals since 1978.

CPAids® Comes Home with the NEW PERSONAL PLANNER.

CPAids accounting software has been used and trusted by professionals since 1978. Now you can have much of this same expertise at home with the new CPAids **Personal Planner**. Priced at only **$99.** the **Personal Planner** will calculate your tax liabilities for the years 1983 thru 1986. Use it for retirement planning, investing, IRA contributions, home buying, two income planning and even checking your federal tax return.

The CPAids **Personal Planner** organizes your tax information, keeping your records readily available for instant evaluation. The **Personal Planner** was designed by CPAids programmers who have had years of experience programming for professionals. Although you'll get professional results, you don't have to be an accountant to get them. Requiring only 54 input fields, you get the maximum of output with the minimum of input.

CPAids **Personal Planner** calculates the following schedules and forms:

A	Itemized Deductions
B	Interest/Dividends
D	Capital Gains
G	Income Averaging
SE	Self-Employment
W	Joint Filing Status
4972	Special Ten Year Averaging
6251	Alternative Minimum Tax

CIRCLE 120 ON READER SERVICE CARD

Easy to use, the **Personal Planner** requires only a fifteen page documentation. A complete set of input sheets is also included. Available for the IBM PC, Sharp PC 5000 and other IBM compatibles. Also available on the DEC Rainbow and other CP/M compatibles.

*CP/M is a trademark of Digital Research, Inc. DEC Rainbow is a trademark of Digital Equipment Corp. IBM is a trademark of International Business Machines Corp. Sharp PC 5000 is a registered trademark of Sharp Corporation

CPAids, Inc. 1061 Fraternity Circle
Kent, Ohio 44240 (216) 678-9015

Help me reduce my taxes—Enclosed is my **$99.** for the **Personal Planner**. *Residents of Ohio add 5½% sales tax

☐ My check is enclosed. Computer Type: _____

Name (Please print in full)

Street

City State Zip

Telephone #

☐ VISA ☐ MasterCard Exp. Date: _____

Card #

Signature

Phone orders accepted for charges and C.O.D.

☐ Send me your FREE brochure on other CPAids Software.

Leave Your Dictionary On the Shelf Where it Belongs

V·SPELL Spelling Corrector vs. A Spelling Checker — No Contest.

Every spelling checker on the market today will point out the words that you have misspelled.

Then what?

You still have to look up the correct spelling in a dictionary and in most cases correct it yourself with your word processor. (Try looking up a number of words you didn't know how to spell in the first place.)

Introducing V-SPELL - the spelling corrector.

V-SPELL not only finds misspelled words, it highlights each word in context and immediately displays a choice of correct spellings from its dictionary. Choose or enter the right spelling and V-SPELL will automatically make the correction. You won't have to spend time leafing through a dictionary.

Several spelling checkers provide hyphenation based on a mathematical formula. It guesses where hyphenation should occur. No guessing with V-SPELL. Its hyphenation is built directly into the dictionary.

V-SPELL provides you with two dictionaries - a 60,000 word main dictionary, carefully balanced to include often used and commonly misspelled words, and an extra dictionary for your own words. You can add as many words as you like to either dictionary.

V-SPELL is fast. It can proof 40 pages of text in under 2 minutes. Menu driven operation and on-line help make it easy to learn, easy to use.

Every spelling checker can show you words you've misspelled - only V-SPELL will help you correct them.

	V-SPELL Spelling Corrector	The Word Plus	Super Spell-Guard
Displays words in context	Yes	Yes	No
Automatically provides alternative spelling	Yes	No	No
Corrects automatically	Yes	Yes	No
Special use dictionary	Yes	Yes	Yes
Size of dictionary	60,000	45,000	20,000
Expandable dictionary	Yes	Yes	Yes
Dictionary hypenation	Yes	No	No

Technical Features

V-SPELL can ignore printer control characters and other non-ASCII characters in your document.

Any text can be hyphenated by V-SPELL for typesetting and other professional applications.

Parameters and options such as the number of lines of text displayed in context, character to use for hyphenation, and treatment of high-bit characters may all be customized.

V-SPELL runs on practically every computer made (CP/M, CP/M-86, Concurrent CP/M-86, MS-DOS, etc.) and is compatible with most word processing programs. To order, simply call (313) 996-1299 or ask for it from a reputable dealer $125

CompuView

1955 Pauline Blvd., Ann Arbor, Michigan 48103 (313) 996-1299 Telex - 701821
Orders: P.O. Box 1349, Ann Arbor, Michigan 48106

The Word Plus is a registered trademark of Oasis Systems, Inc. Super SpellGuard is a registered trademark of Verrum Corporation. CP/M is a registered trademark of Digital Research, Inc. MS-DOS is a registered trademark of Microsoft, Inc.

CIRCLE 207 ON READER SERVICE CARD

SOFTWARE TO STIMULATE

YES

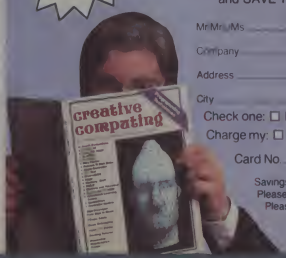
FREE 10th ANNIVERSARY LCD QUARTZ CLOCK WITH PAID SUBSCRIPTION

I want to stimulate my mind with creative computing for:

☐ 8 Issues for $13.97 and SAVE 16%

☐ 12 Issues (One Year) for $19.97 and SAVE 20%

☐ 24 Issues for $36.97 and SAVE 26%



Mr/Mrs/Ms _____ BC 45366

Company _____

Address _____

City _____ State _____ Zip _____

Check one: ☐ Payment enclosed ☐ Bill me later

Charge my: ☐ American Express ☐ Visa ☐ MasterCard

Card No. _____ Exp. Date _____

Savings based on full one-year subscription price of $24.97
Please add $5 per year in Canada, $10 per year in all foreign countries.
Please allow 30 to 60 days for delivery of first issue

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 66 BOULDER, COLORADO

POSTAGE WILL BE PAID BY ADDRESSEE

creative computing

P.O. Box 5214
Boulder, Colorado 80321

SOFTWARE TO STIMULATE

Stimulate your mind every month with the #1 magazine of computer applications and software. CREATIVE COMPUTING! There is no other magazine like CREATIVE COMPUTING. WE TALK YOUR LANGUAGE! ... Any make... any model... whether it's Apple, IBM, Radio Shack, TI, Mattel, Atari, Commodore. CREATIVE COMPUTING has monthly departments and articles you can use! You will receive a continuing education on *everything* related to personal computing with intriguing and useful applications for your personal computer. This is a magazine that will help you get more out of your computer—versatility, function and enjoyment—in easy-to-read and fully illustrated articles!

Subscribe to CREATIVE COMPUTING today and save up to 26%!

YES creative computing

P.O. Box 5214, Boulder, Colorado 80322 CC428

FREE 10th ANNIVERSARY LCD QUARTZ CLOCK WITH YOUR SUBSCRIPTION

Please enter my subscription to CREATIVE COMPUTING for:

- ☐ 8 issues for $13.97. I SAVE 16%!
- ☐ 1 year (12 issues) for $19.97 I SAVE 20%!
- ☐ 2 years for $36.97. I SAVE 26%!

Mr/Mrs/Ms _____ (please print name in full)

Company _____

Address _____

City _____ State _____ Zip _____

Check one: ☐ Payment enclosed ☐ Bill me later

Charge my: ☐ American Express ☐ Visa ☐ MasterCard

Card No. _____ Exp. Date _____

Savings based on full one-year subscription price of $24.97.
Please add $5 per year in Canada, $10 per year in all foreign countries.
Please allow 30 to 60 days for delivery of first issue.

TRANSEND
PC
ComPlete

99¢ Software is here!

AND IT'S AS EASY TO USE AS IT IS TO PAY FOR

INTRODUCING Transend PC ComPlete

Here it is! The first complete and integrated communications software. It's easy to use and has more bells and whistles than we can list. So we've developed a TRIAL-SIZE package that allows you to experience Transend's unique design and awesome power for 15 phone calls. ComPlete. For less than a buck!

- Zoom-in windows
- Built-in Letter Writer: Word processor
- Unattended electronic mail
- Automatic Learn mode that teaches your computer to think
- Instant "peek" at a file
- 99¢ trial-size package with all functions operational

User defined function keys allow you to perform complicated on-line tasks with the touch of a key, saving you valuable on-line time (and money!).

And It's Integrated

Transend PC ComPlete's ability to automatically access information and electronic mail services, and to send and receive MS/DOS files with verification are features you would expect, but what you wouldn't expect are

And A Surprise Offer

Each TRIAL SIZE box contains a surprise gift worth $10.00... and if that's not throwing our shirt in, we'll even give you the buck back when you trade-in your TRIAL-SIZE for the FULL-SIZE Transend PC ComPlete with unlimited calls.

Transend is on trial at computer and software stores everywhere or from:

TRANSEND
2190 Paragon Dr.
San Jose, CA 95131
(408) 946-7400

TRIAL SIZE
Allows up to 15 phone calls.

CIRCLE 199 ON READER SERVICE CARD

Logo Type

James Muller

There is a certain bit of magic in the Logo language that makes learning a lot of fun. Mathematics, geometry, and other subjects are no longer boring school subjects. On the computer screen, they become brain-teasers and other enjoyable discoveries that can help young people learn to think. The value of this learning fun was dramatically demonstrated the summer the Young People's Logo Association was formed.

For several hours each week, a group of young people ranging in age from 6 to 13, met in a Richardson, TX, garage to explore Logo and the computer. Fourth of July fireworks, lunar lander games, and some intriguing graphics were the visible results of these sessions.

But what were the kids learning?

As a very simple experiment, the kids were asked to draw some random angles on blank paper: "If the turtle drew a line on the screen, made 147 turtle turns, and then drew another line, what would the screen look like? What about 217 turns? 313 turns?"

These same questions were then posed to circuit designers, who acknowledged that the kids were able to visualize the angles more accurately than they were. As engineers, they relied on their tools rather than their imaginations to measure angles and distances. However, the engineers did claim credit for drawing straighter lines.

One of the ways to help children learn to visualize angles and distances is through "target practice." A simple way to start is to place stickers on the screen and then see who can move the turtle to the sticker in the fewest moves. A slightly more complex version of the same exercise is to play "turtle baseball." Place four stickers on the screen, one of which is home plate. Then see who can move around the bases with the fewest mistakes. You can make the game as simple or as complex as you choose. The important thing is to practice visualizing angles and distances on the screen.

Atari Logo offers some nice features for making an enjoyable game out of angle and distance practice. Where most other versions have one triangular turtle, Atari Logo has four turtles, each of which can act independently. The language also has collision detection to test if two turtles are touching. In the target practice game shown in Listing 1, one of the turtles is randomly placed on the screen. Then, by typing the word, ZAP, followed by an angle and a distance, a second turtle is "zapped" at the target. If the two touch, the screen flashes and a message appears at the bottom of the screen.

The Important thing is to get the players to think about what they are doing, to think beyond the limits of the computer keyboard and screen.

The T procedure sets up the game. RANDOM will not select a negative number. Thus, the statement is written that IF the random number is 0, the computer will select a number between 0 and 110. If not, it will subtract a random number from 0. The result will provide the numbers required for the procedure ANGLE :NUM. The target turtle will turn right the number of degrees selected, and the procedure will then pick a random distance. To keep it interesting the distance ranges from 50 to 110.

Once the target turtle appears on the screen, the player must type in ZAP followed by an angle and a distance. The first turtle then turns right and moves the distance selected. The PX represents Penreverse. In this mode, the turtle draws a line where none exists. However, when asked to move back, it erases any line previously drawn. The computer then tests: IF turtles 1 and 2 are NOT in a CONDition of TOUCHING, then the first will wait 20, move BACK the distance entered, and SETHeading to 0 again.

WHEN turtles 1 and 2 are TOUCHING, control turns over to the CHEERS procedure. The background flashes, and "Congratulations" appears at the bottom of the screen.

Games like this can, of course, be written for any version of Logo. Scoring and multiple-player options can add to the appeal. The important thing is to get the players to think about what they are doing, to think beyond the limits of the computer keyboard and screen. There are few things as exciting as watching a child's imagination in action. However, there is a marvelous quotation of unknown origin which helps put the value of imaginative play into perspective: "He who has imagination without learning has wings but no feet."

The author must have been thinking of Logo. ■

NOW, THE LOWEST PRICES EVER ON

3M Scotch®
DISKETTES

SPECIAL SALE!
Prices good thru 9/30/84 only.

$1.49 ea 5¼" SSDD Qty 50
$1.95 ea 5¼" DSDD Qty 50
$2.19 ea 5¼" SSDD-96TPI
$2.75 ea 5¼" DSDD-96TPI

SOFT SECTOR ONLY!
MINIMUM ORDER 50 DISKETTES
Add 10% for orders of less than 50.
These are factory-fresh 3M diskettes packed in boxes of 10 with Tyvek sleeves, reinforced hubs, identification labels and write-protect tabs

LIFETIME WARRANTY!
ON ALL 3M SCOTCH DISKETTES!

SUPER SPECIAL!

Order 50 3M Scotch Diskettes on this special offer and you can get an Amaray Media Mate 50 for only $9.99 (shipping included). Normally, a $14.95 retail value, this is one of the best designed disk storage units we've seen. Special slots and ridges for stacking. A great buy.

With 50 3M Scotch 5¼" Diskettes $9.99
Ordered alone $10.95 + $2.00 Shpng.

8" 3M Scotch Diskettes
8" SSSD $2.05 ea 8" SSDD $2.50 ea
8" DSDD $3.10 ea

SOFT SECTOR ONLY!
MINIMUM ORDER 8" DISKETTES: 20

3M HEADCLEANING KITS
Stop swearing and start cleaning. This non-abrasive cleaning kit has everything you need for 30 applications. $18.00 + $1.50 Shpng.

DISKETTE 70 STORAGE: STILL A GREAT BUY
Dust-free storage for 70 5¼" diskettes. Six dividers included. An excellent value $11.95 + $3.00 Shpng.

DISK CADDIES
The original flip-up holder for 10 5¼" diskettes. Beige or grey only. $1.65 ea + 20¢ Shpng.

PRINTER RIBBONS AT BARGAIN PRICES!
Brand new ribbons produced to manufacturer's specs.

Epson MX-70/80	$3.58 ea + 25 Shpng.
Epson MX-100	$6.99 ea + 25 Shpng.
Okidata Micro 83	$1.48 ea + 25 Shpng.
Okidata Micro 84	$3.48 ea + 25 Shpng.

Shipping: 5¼" DISKETTES—Add $3.00 per 100 or fewer diskettes 8" DISKETTES—Add $4.00 per 100 or fewer diskettes Other Items: Add shipping charges as shown in addition to diskette shipping charges Payment: VISA and MASTERCARD accepted COD orders only, add $3.00 handling charge Taxes: Illinois residents only, add 6% sales tax

FOR ORDERS ONLY:
1-800-621-6827
(In Illinois 1-312-944-2788)
INFORMATION & INQUIRIES:
1-312-944-2788 only!
HOURS: 8AM - 5PM Central Time.
Monday - Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

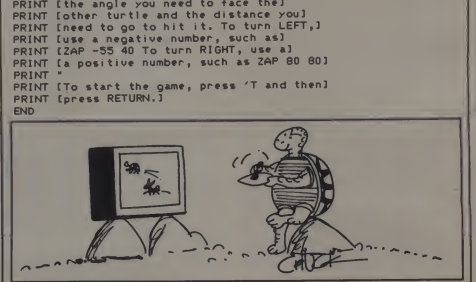
DISK WORLD!, Inc.
Suite 4806 • 30 East Huron Street • Chicago Illinois 60611

DISK WORLD! Authorized Distributor Information Processing Products 3M

Logo

Listing 1. Turtle Target Practice Game.

```
TO FLASH :CLR
SETBG :CLR
WAIT 5
MAKE "CLR :CLR + 7
IF :CLR > 126 [SETBG 74 STOP]
FLASH :CLR
END

TO CHEERS
CT
REPEAT 5 [PRINT [CONGRATULATIONS!]]
FLASH 7
T
END

TO T
CT
TELL [0 1 2 3] CS
ST
IF 0 = RANDOM 2 [ANGLE RANDOM 111] [ANGLE 0 - ( RANDOM 111 )]
WHEN TOUCHING 1 2 [CHEERS]
END

TO ANGLE :NUM
TELL 2
PENUP
SETH 0
RIGHT :NUM
MAKE "DIS ( ( RANDOM 61 ) + 50 )
FORWARD :DIS
END

TO ZAP :ANG :DIS
ASK 1 [RT :ANG PX FD :DIS]
IF NOT COND TOUCHING 1 2 [ASK 1 [WAIT 20 BACK :DIS SETH 0]]
END

TO START
TS CT
SETCURSOR [0 3]
PRINT [Welcome to the game of...]
SETCURSOR [0 5]
PRINT [* * * * * ZAP THE TURTLE * * * * *]
SETCURSOR [0 8]
PRINT [A turtle will appear somewhere on]
PRINT [the screen. Can you guess the angle]
PRINT [to turn and the distance to]
PRINT [Zap the Turtle?]
PRINT "
PRINT [To play the game, type ZAP and then]
PRINT [the angle you need to face the]
PRINT [other turtle and the distance you]
PRINT [need to go to hit it. To turn LEFT,]
PRINT [use a negative number, such as]
PRINT [ZAP -55 40 To turn RIGHT, use a]
PRINT [a positive number, such as ZAP 80 80]
PRINT "
PRINT [To start the game, press 'T and then]
PRINT [press RETURN.]
END
```



COMPUTER DISCOUNT PRODUCTS

Stocking **HUGE** Inventories of APPLE & IBM Products SINCE 1977

★ GUARANTEED Fair Pricing Is Our Policy ★

KOALA For Mac & PC!

Mac Support Learning Keys Disk 59.95

Koala Touch Pad Mac & PC! 85.95

DISKETTES

	10	100
MAXELL 5 SS/DD	27.99	259.99
VERBATIM 5 SS/DD	26.99	249.99
VERBATIM DataLife	36.99	349.99

MEMOREX 3½" (MAC) 41.99

RECENT RELEASES!

Call For More Information

ORANGE MICRO For Your IBM PC

Mr. Chips – 4 Function Board ● Chipmunk – 9 Function Board

TRILLIUM Adventure Games For Apple

Fahrenheit 451 ● Rendezvous with Rama ● Shadowkeep

WINDHAM CLASSICS Adventure Games For Apple & IBM

Wizard of Oz ● Gulliver's Travels ● Swiss Family Robinson

SPINNAKER
FOR APPLE & IBM

ALPHABET ZOO, HEY DIDDLE	ea21.99
DELTA DRAWING	23.99
FACE MAKER	21.99
FRACTION FEVER	24.99
KIDCODE/PIC	21.99
MOST AMAZING THING	26.99
RHYME & PUNISHMENT	19.99
SNOOPER TROOPS - I & II	29.99
STORY MACHINE	23.99

APPLE SOFTWARE

BPI GL, AR, AP, Fed Mgr	ea279.99
BRODERBUND Arcade Machine	36.99
Bank Street Writer	44.99
Dvd Lodderunner	ea24.99
DLM Alien Addition Alligator Mix	ea22.99
Demolition Division	22.99
Dragon Mix	22.99
Mavis Multiplication	22.99
Minus Mix-o-so	22.99
Word Tyger Word Invasion	ea21.99
Word Radar Sport Ing Wz	ea21.99
EDUMATE (Now Peachtree)	
Algebra	ea21.99
Counting Bee	23.99
Decimals: Fractions 3.0	ea23.99
PSAT Word Attack	23.99
SAT Word Attack	23.99
JACK NICKLAUS	24.99
KEYBOARDING Format II	109.99
LEARNING Ctr Number Games	26.99
Number Pyramids Spell	ea26.99
Germicides Puzzle Secret	ea26.99
Mapower Mapache Hotel	ea26.99
Patchy's Boots	34.99
MICROLAB Bilge	27.99
MICROLAB Miner 2049er	27.99
MICROSOFT Bilogue	109.99
MULTI-LABS & SEASE (Basic)	79.99
SEGA Chess	25.99
PFS Report	79.99
File	89.99
Graph	89.99
Write	89.99
SENSIBLE SPELLER	79.99
SUBLOGIC Night Mission Pinball	27.99
Flight Simulator II	27.99
S.A.M. II	39.99

PRINT SHOP 39.99

ACCESSORIES

Power Protector Entertainment	64.99
FLIP 'N FILE (w/Dividers)	14.99
FLIP'N FILE w/Dividers (25)	17.99
FLIP'N FILE w/Dividers (50)	24.99
HAYES 300 Baud Smartmodem	219.99
1200 Baud Smartmodem	495.99
LIBRARY CASE	1.99
MENDLNK PC Saver	29.99
PRINTERS III-TOH	279.99
Epson FX80	499.99
Epson RX80	329.99
Okidata 82-83	$CALL
PRINTER STAND Sm (pngin)	24.99
PRINTER STAND Lg (pngin)	29.99
RIBBONS-Brother	$Call
MX & FX 80	4.99
MX & FX 100	7.99
OKI 82/ 83/ 92, 93 & Gemini	2.99

OKIDATA 82P *For IBM Only*
Inclusive Plug 'n Play 408.56

APPLE HARDWARE

HEIGHT DRIVE	219.99
AUTO RESTART KEY	19.99
DAN PARMAR Lower Case (rev 1-6)	25.99
Lower Case 2 (rev 7)	18.99
EASTERN Wildcard I	111.99
HAYES Micromodem Iie	239.99
KOALA PAD	85.99
KRAFT Joystick	44.99
M CRO SCI A2 Drive	219.99
MICROSOFT Softcard	229.99
MOUNTAIN Ramquik + 32K	159.99
MOON NUBOARD	199.99
ORANGE MICRO Grappler +	114.99
Interface	119.99
Buffered Grappler +	179.99
PADDLE SPLITTLE	24.99
TEAM TECH 128K Ram	379.99
Saturn 64K	99.99
Accelerator /	449.99
Neptune 64K	199.99
TG Joystick	39.99
Paddles	19.99
THUNDERCLOCK	99.99

MOCKINGBOARD (Re-c) 99.99

IBM

ALPHA Typetutor	79.99
ASHTON TATE dBase II	399.99
Friday	184.99
Encyclopedia	56.99
ASI: I/O Plus	$CALL
Mega Plus	289.99
Six Pack Plus	279.99
BRODERBUND Serpentine	26.99
Lode Runner	24.99
CM Mastery	ea31.99
Subjects	ea19.99
CROSSTALK	139.99
EDUMATE (Now Peachtree) Algebra I	34.99
HAYES 1200B Modem	439.99
JOYSTICK Kraft or TG	44.99
LIFETREE Volkswriter	119.99
LOTUS 1-2-3	$CALL
MASTERTYPE	34.99
MICROLAB Miner 20-49er	27.99
MICROSOFT Flight Simulator	35.99
Mouse	129.99
Multiplan	109.99
MONOGRAM Dollars & Sense	119.99
PC Fox Pro	99.99
PC CRAYON	49.99
Sales	47.99
PFS: Write	99.99
File	99.99
Report	99.99
Graph	99.99
SIERRA ON LINE Frogger	26.99
SIR TECH Wizardry	44.99
SUBLOGIC Night Mission Pinball	32.99
TEAC 1/Height TM55D Drive	229.99
TITAN 64K (Board)	499.99
VISICORP Visicalc	184.99
Schedule	ea199.99

PLANTRONICS ColorPlus 375.99

Sierra ON-LINE INC

BC QUEST-for-TIRES	27.99
FROGGER (Ap)	21.99
GENERAL MANAGER	149.99
HOME WORD	49.99
MARK-IT	23.99
SCREENWRITER II	81.99
ULTIMA II	36.99

Beagle Bros
Micro Software Inc.

ALPHA PLOT	25.99
APPLE MECH - FLEX TEXT	ea19.95
BEAGLE BASIC: DOUBLE TAKE	ea23.95
DOS BOSS	17.95
FRAME-UP	19.99
GPLE	32.95
PRONTO: DOS	19.99
QUICK DISK II	15.99
TYPEFACES	15.99
UTILITY-CIDE	19.99

QUADRAM

APE, APPLE, PARALLEL	129.99
xRAM 80 column RAM IE	129.99
MICROFAZER (Ac-Configurations)	149.99
QUAD 512+ (64K)	229.99
QUADBOARD I or II (No K)	219.99
QUADBOARD I or II (64K)	269.99
QUADCOLOR I	209.99
QUADCOLOR I UPGRADE	209.99
QUADLINK	479.99

QUADCHROME
Hi-Res Color Monitor $529.99

Novation

103 Smart Cat	169.99
103/212 Auto Cat	309.99
J Cat	109.99
Access 123 (IBM)	435.99
Applecat Upgrade 1200 Baud	309.00
Cat Modem	135.99
Expansion Module	29.99

APPLECAT II
1200 Baud Modem 259.99

Continental

ROM FL 1st CLASS MAIL (AP)	59.99
ROM FL 1st CLASS MAIL (IBM)	71.99
HOME ACCOUNTANT (AP)	44.99
HOME ACCOUNTANT + (IBM)	84.99
PROPERTY MGMT (AP, IBM)	299.99
TAX ADVANTAGE (Ap)	39.99
TAX ADVANTAGE (IBM)	49.99
ULTRAFILE (IBM)	119.99

HOME ACCOUNTANT
Re/c 57.99 Mac 75.99

INFOCOM

FOR APPLE & IBM
For CP/M Versions – $CALL

DEADLINE	32.99
ENCHANTER	32.99
PLANETFALL	32.99
SORCERER	31.99
STARCROSS	32.99
SUSPENDED	32.99
WITNESS	32.99
ZORK	24.99

SEASTALKER 31.99

QUALITY MONITORS

AMDEK 300A Apple	158.99
AMDEK 310A IBM	179.99
PRINCETON RGB HX-12	475.99
TAXAN 420 RGB	489.99
TAXAN 12" Green IBM	159.99
TAXAN 12" Amber	189.99
TAXAN 12" Green 20MHZ	129.99
USI Pi 1 9" Green 20 mh	99.99
USI Pi 4 9" Amber 20 mh	109.99
USI I-400C Color Composite	279.99

TAXAN 12" Amber *For Apple* 20MHZ 139.99

MicroPro

INFOSTAR	259.99
MAILMERGE	139.99
SPELLSTAR	139.99
WORDSTAR	259.99
WORDSTAR PRO	389.99
PRO OPTIONS PACK	182.99

Videx

ENHANCER I	199.99
FUNCTION STRIP	21.99
HARDSMARTH	19.99
MICROMODEM CHIP	24.99
PSIO	169.99
SOFTSWITCH	25.99
ULTRAPLAN	129.99
VIDEOTERM w/SS – HW	179.99
Apple Writer for Videoterm	23.99
VTCalc	39.99
Vocalic Memory Expansion	71.99
Vocalic for Videoterm	44.99
VTRS	299.99

MAIL AND PHONE ORDERS
Inquiries Welcome!
(408) 985-0400
MAIL, PHONE, WILL-CALL
SERVICE FROM 6 AM PST

COMPUTER DISCOUNT PRODUCTS
860 So. Winchester Bl., San Jose, CA 95128
– CALL (408) 985-0400 –
Retail Showrooms In California
San Jose • San Mateo • San Francisco

- No Charge For Credit Cards
- Prices Subject To Change
- Software Sales Are Final
- International Orders Welcome
- Min. UPS Chg. $4 + lms.
- Min. US Postal Chg. $10
- **P.O's Welcome – $CALL**

VISA | AMERICAN EXPRESS | MasterCard

A New Face For Western Union

Telecommunications Talk

Brian J. Murphy

The telegraph company ain't what it used to be.

Western Union, which long ago phased out the uniformed delivery boy on the bicycle, is now entering the business and personal computer arena in a big way with its own computer telecommunications system called EasyLink.

EasyLink places virtually all of Western Union's worldwide communications net at your disposal. With EasyLink you can receive or send messages to or from any Telex terminal. You can use it to send Mailgrams, E-COM mail, Cablegrams, and telegrams. You can send messages on a priority basis and request notification of message delivery. You can also use the system to send a mailing to up to 250 addresses, one of several mass mailing schemes that allows you to hit a broad or selected set of addresses.

EasyLink also includes a service they call F.Y.I. which offers news, sports, weather and human interest features much as you would find on the information utilities. Here we shall concentrate on EasyLink's powerful message system.

When you subscribe to the service you get a set of codes for use in logging onto the system and an 800 number to use to access the network. You also get a mailbox number, and a Telex number. If you have questions Western Union provides an 800 number to call to reach a customer assistance representative.

The most valuable article they send you is the EasyLink user manual, which is without doubt one of the best I have ever seen. Written with the needs of the average user in mind, it explains all the procedures for using the system in precise, unambiguous prose. It will surely abbreviate the amount of time required to learn to use the service. The result of all this attention is the very strong impression that Western Union is going to care and be there if you have problems with the system and need a little hand holding and advice.

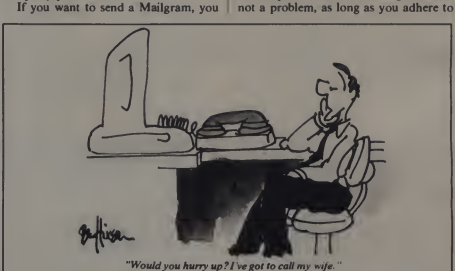
Once you have logged on and entered your various access codes, you see the prompt, PTS (which stands for Proceed To Select). It is here that you enter the correct "address" for the type of EasyLink service you want.

To send a Telex message you enter the telex number and the answerback number. For worldwide Telex you append a country code to the number. To send to an EasyLink mailbox, you simply key in the appropriate eight-digit number for the party you want to reach.

If you want to send a Mailgram, you enter the command /ZIP, then the address of the recipient. For a telegram you enter a /PMS command. /INT is the command for an international Cablegram, and for InfoCom you append the command /ICS.

Computer letters come in three flavors: Computer Letter Service (delivery in three days), E-COM (delivery in two business days or less), and Overseas Priority Letter (delivered in two business days). To send a computer letter you first key in the EasyLink address, 62900396. This must be done before you use a slash command to access one of the three services. Once you get the GA (Go Ahead) prompt you can then enter the /CLS (computer letter service), /ECOM, or /OPL (overseas priority letter) command.

Having decided on the service, the next step is to enter the message. That is not a problem, as long as you adhere to



"Would you hurry up? I've got to call my wife."

BUYING A PASSWORD™ MODEM CAN SAVE YOU UP TO $250.

AND THAT AIN'T HAYES!*

You can bank on it. Your outlay will be less than if you settle for our major competitor, but not your output! A Password™ modem sends and receives up to 120 characters per second. Provides both 1200 and 300 baud capacity. Offers total interchangeability that lets you transmit information from any make microcomputer to any other make. And your investment is protected by a 2-year warranty.

Unlike our major competitor, Password™ delivers operating simplicity, plus the convenience of uncommon portability. Thanks to lighter weight, it goes almost anywhere. And because of the ingenuity of Velcro™ strips, it attaches wherever you need it, from the side of a desk to the side of a computer!

This means that Password™ doesn't tie you down, and its price won't hold you up. It features auto-dial, auto-answer, and even knows when to disconnect. If you're cost conscious, but refuse to sacrifice high-speed capability and performance, hook up with the right modem—Password™. The smart decision.

PASSWORD™
by **U.S. Robotics, Inc.**

1123 W. Washington
Chicago, IL 60607
Phone (312) 733-0497
Outside Illinois:
1-800-DIAL USR

CIRCLE 200 ON READER SERVICE CARD

*Hayes® is a registered trademark of Hayes Microcomputer Products, Inc.

Hayes. Leading the way with quality telecomputing systems for the personal computers that businesses use most.

When it comes to communicating—computer to computer—Hayes says it best. All you need is a Hayes Smartmodem (it's like a telephone for your computer) and Smartcom II* software, to get you into all the right places.

In no time at all, and with no assistance at all, you can create, send and store files, and automatically log on to information services. The communication possibilities are endless!

Introducing our new Smartcom II. More connection capabilities. More convenience.

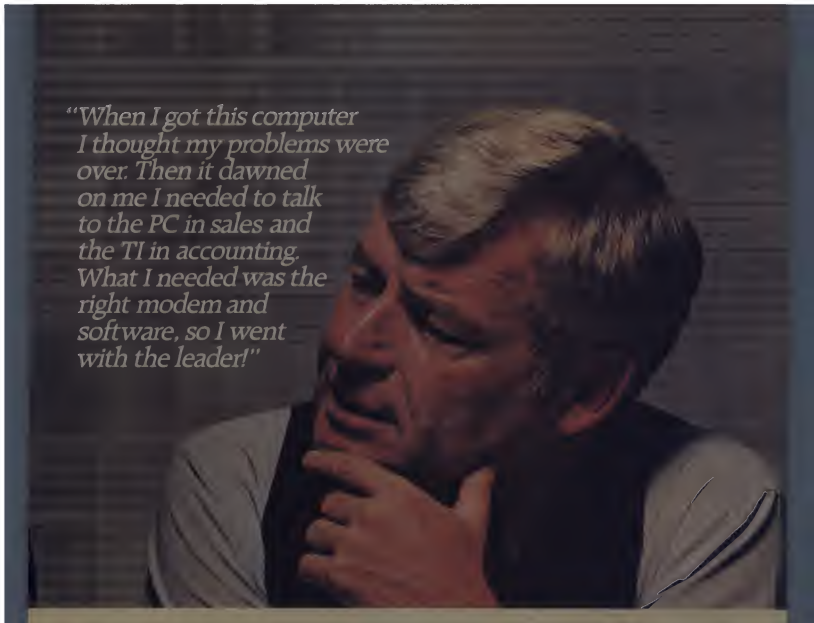
Now Hayes goes even further to streamline your communications and optimize your connections.

Smartcom II software is currently available for more than 16 personal computers (with even more to come). That means you can communicate, Smartcom to Smartcom, with an IBM PC, DEC Rainbow 100, HP 150, TI Professional Computer* and others.

And that's not all! Smartcom II also emulates the DEC VT100 and VT52 terminals, now in widespread use in many businesses. This feature lets your personal computer "pretend" it's a DEC terminal, opening the door to a vast installed base of DEC minicomputers!

We stand on protocol.

In addition to the popular Hayes Verification protocol, the new Smartcom II also includes the XMODEM protocol, ensuring accurate transmission to a wide range of personal computers and mainframes at information services. By matching the protocol (or "language") of a remote computer to yours, Smartcom II can transmit information error-free, regardless of interference on the phone lines.


"When I got this computer I thought my problems were over. Then it dawned on me I needed to talk to the PC in sales and the TI in accounting. What I needed was the right modem and software, so I went with the leader!"

Voice to data—in the same call!

With Smartcom II, you can easily switch from voice to data transmission (and back again), all in the same phone call. This saves you time and money, since you don't have to hang up and dial again.

Your Hayes telecomputing system works—totally unattended.

Smartcom II makes telecomputing simple, even when you're not there. It allows your Smartmodem to receive a message for you when you're out, and leave it on your disk or printer. And you can tell Smartcom II to "save" the messages you've created during the day, and automatically send them at night, when phone rates are lowest.

Get your hands on the leader.

With an unsurpassed record of reliability, it's a small wonder Smartmodem is such a smart buy! Smartmodem 300™ (the first of the Smartmodem series) dials, answers and disconnects calls automatically. Smartmodem 1200™ and Smartmodem 1200B™ (it plugs into an expansion slot inside an IBM PC or compatible), provide high-speed, high-performance communications for businesses of all sizes.

And when Smartmodem is purchased with Smartcom II, you have the most dependable telecomputing system available for your personal computer.

Everything we do at Hayes is designed to make communications easier for you. Feature-rich, direct-connect modems. Menu-driven software. Concise documentation. *And* a customer service organization, second to none!

See your dealer right now for a hands-on demonstration of Smartmodem and our latest version of Smartcom II. From the telecomputing leader. Hayes.

Hayes

Hayes Microcomputer Products, Inc.
5923 Peachtree Industrial Blvd.
Norcross, Georgia 30092 404/441-1617.

CIRCLE 146 ON READER SERVICE CARD

Smartcom II is a registered trademark of Hayes Microcomputer Products, Inc. Smartmodem 300, Smartmodem 1200 and Smartmodem 1200B are trademarks of Hayes Microcomputer Products, Inc
*Trademarks of International Business Machines Corp., Digital Equipment Corporation, Hewlett-Packard and Texas Instruments ©1984 Hayes Microcomputer Products Inc

Flight Simulator II

For Apple, Atari, & Commodore 64

Put yourself in the pilot's seat of a Piper 181 Cherokee Archer for an awe-inspiring flight over realistic scenery from New York to Los Angeles. High speed color-filled 3D graphics will give you a beautiful panoramic view as you practice takeoffs, landings, and aerobatics. Complete documentation will get you airborne quickly even if you've never flown before. When you think you're ready, you can play the World War I Ace aerial battle game. Flight Simulator II features include ■ animated color 3D graphics ■ day, dusk, and night flying modes ■ over 80 airports in four scenery areas: New York, Chicago, Los Angeles, Seattle, with additional scenery areas available ■ user-variable weather, from clear blue skies to grey cloudy conditions ■ complete flight instrumentation ■ VOR, ILS, ADF, and DME radio equipped ■ navigation facilities and course plotting ■ World War I Ace aerial battle game ■ complete information manual and flight handbook.

See your dealer . . .

[illegible] (800) 637-4983 [illegible]

Order Line: 800 / 637-4983

CIRCLE 100 ON READER SERVICE CARD.

subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

these text and line width restrictions:

EasyLink and EasyLink Telex—50,000 characters total, no line width restriction.

All Telex—50,000 characters total, 68 characters per line.

Cablegram, Telegram, and Mailgram—15,000 characters total, 68 per line.

Computer Letter Service—No more than 371 lines, 68 characters per line.

E-COM—Total 97 lines, 68 characters per line.

Overseas Priority Letter—363 lines total, 68 characters per line.

The line is ended simply with an ENTER or RETURN, depending on your terminal or computer. The end of the message is signaled by an LLLL at the start of a new line followed by ENTER. If you have made no mistakes in writing your message, the system responds with a MESSAGE ACCEPTED prompt. You may begin a new message right away.

Before I move on to pricing, a word about Telexing. This is one of the most exciting services WU offers. If you have ever seen the big, bulky, blue Telex machine, which performs only one function, you can readily appreciate the advantage of being able to dispense with it all together in favor of your personal computer work station. Add to this the ability to use your personal computer word processor in preparing your message (EasyLink will show you how) and the accessibility of so many other message services and you have a powerful argument in favor of the EasyLink service.

Western Union claims that some of their own services are actually cheaper on EasyLink than they are by phoning Western Union to send a cable or wire.

I was all set to tell you that this was an expensive service, but it isn't. In fact, Western Union claims that some of their own services are actually cheaper on EasyLink than they are by phoning Western Union to send a cable or a wire.

There is no subscription fee or start-up expense of any kind. They send all the materials, including the password codes and the loose-leaf manual, at no charge. Nor is there a minimum charge for the first three months of use. You will be billed for each message you send, however, according to the applicable rate structures. Starting with the fourth month there is a $25 monthly minimum use fee.

Here are some sample fees to give you an idea of the pricing of various services (all based on 300 baud transmission):

EasyLink to EasyLink—$.30 minute.

Telegram—$1.80 minute plus $3.00 service charge from 6:00 a.m. to 7:00 p.m., $1.50 from 7:00 p.m. to 6:00 a.m.

Mailgram—First page, $3.00; subsequent pages $.75 each.

E-COM—First page, $1.15; subsequent pages $.30 each.

Telex I to any U.S. Telex terminal—$.43 per minute. The service outputs at 400 characters per minute.

My conclusion is that EasyLink works, that it is affordable, and that it is great for businesses and professionals who use the mail frequently. If you can reduce some of your routine long distance calls to written form, you will save on phone expense too.

EasyLink info is available from Western Union, Department 38, 1651 Old Meadow Rd., McLean VA 22102 or by calling (800) 336-3797, ext. 38. ■

Programming Utilities for the Apple®
—APPLE II, II+, IIe and IIc—

THE #1 APPLESOFT PROGRAM EDITOR:

❑ **GPLE ($49.95**—supports DOS 3.3 *and* ProDOS™) Global Program Line Editor lets you edit 40 and 80-column Applesoft program lines *FAST* without awkward cursor-tracing or clunky "Escape editing" FIND/REPLACE any word or variable in your programs. Define Esc plus any-key to do any task (Esc-1 can catalog disk, etc.) MOVE DOS 3.3 above main memory to gain an EXTRA 10K of space

2-WAY SCROLL FOR LISTINGS & CATALOGS:

❑ **DOUBLE-TAKE ($34.95**—supports DOS 3.3 *and* ProDOS™) Lets Listings & Catalogs scroll Up *and* Down, making file names and program lines easier to access. Fast 2-way scroll for monitor listings too.

AS: "DOGFOOD" X: 3.14158
←**VARIABLE-DISPLAY** prints all strings & variables with values

AS: 100 200 250 300 ←
X: 10 20 3000 3010
CROSS-REF shows line numbers for each variable/string

Also AUTO-LINE-NUMBER, better Renumber/Append, Eliminate/Change Cursor, SpaceOn-Disk... And Tip Charts!!

SUPER-APPLESOFT ENHANCER: (64K reqd.)

❑ **BEAGLE BASIC ($34.95)** lets you re-name Applesoft commands to *anything*. For example **10 POUR X: TO 3: ECRIVEZ "BONJOUR": ENSUITE** Also, obsolete cassette commands (SHLOAD, etc.) are replaced by powerful new commands like **ELSE, HSCRN, SWAP, TONE, SCROLL:**, GOTO/GOSUB a variable too.

SAY, HOW'D YOU MAKE THOSE PROFESSIONAL GRAPHICS AND HI-RES TITLE SCREENS IN YOUR PROGRAMS?

I USED APPLE MECHANIC ROUTINES IN MY APPLESOFT PROGRAMS. I ONLY HAD TO CREDIT BEAGLE BROS IN MY DISK AND MANUAL.

```
5 LIST: LIST: LIST: LIST
6 FOR C = 1 TO 40: POKE 33,C: PRINT: NEXT: GOTO 5
```

BEAGLE BROS EST. 1980 MICRO SOFTWARE, INC.

3990 OLD TOWN AVE. SAN DIEGO, CA 92110 619-296-6400

NEW!

Double Hi-Res!

❑ **BEAGLE GRAPHICS ($59.95)** 128K required. Plot in 16 COLORS and 560x192 pixels, *TWICE* normal-resolution! Super plotting program and commands draw fast hi-res circles & boxes, and FILL HI-RES SHAPES in solid or mixed colors. Easy-convert existing programs (including *Mechanic*) to Double Hi-Res. Many new tricks!

HI-RES SHAPE ANIMATION & FANCY TYPE:

❑ **APPLE MECHANIC ($29.50)** lets you create shapes for hi-res animation. Make custom hi-res color type too. Six proportionally-spaced fonts on the disk. LIST-able demos teach how to use hi-res in your programs.

❑ **TYPEFACES** for Apple Mechanic: **($20.00)** 26 additional type fonts for use with *Mechanic*'s programs.

NEW! HI-RES PICTURE-PRINTER NEW!

❑ **TRIPLE-DUMP ($39.95)** transfers any kind of image to printer. Dump 40 & 80-Column text, and normal or Double Hi-Res pictures (lo-res too). Crop, enlarge, rotate, etc. Also create **GIANT BANNERS** on your printer!

Apple® Disk Librarian

NEW! NEW! MULTIPLE-DISK CATALOG PROGRAM:

❑ **FATCAT ($34.95)** merges all of your DOS 3.3 and/or ProDOS™ Catalogs into one or more "Master Catalog." Search, sort, print, compare—find out what's *really* on all of those disks! **ALPHABETIZE FILE NAMES** on your disks too!

ALL BEAGLE BROS DISKS ARE UNPROTECTED (copyable), AND COME WITH A FREE "PEEKS & POKES" CHART.

❑ **ALPHAPICT ($39.50)** 2-page hi-res drawing & typing. Move any image-section. Compress pix to 1/3 disk space.

❑ **BEAGLE BAG (29.50)** "The best Apple game bargain on the market today!" On 1983's Most-Popular list—Softalk.

❑ **DISKQUIK ($29.50)** Acts like half a disk drive in Slot 3, but silent, *fast*, and 1/10 the price! (req. IIe or IIc w/128K)

❑ **DOS BOSS ($24.00)** Customize DOS 3.3. "Save-protect" files with "Uncopyable" message.

❑ **FLEX TYPE ($29.50)** Put variable-sized text on the screen with normal Basic commands.

❑ **FRAME-UP ($29.50)** Create key-controlled or unattended shows of your screen images.

❑ **PRONTO-DOS ($29.50)** Load/Save at 3X speed. Move DOS for an extra 10K! TYPE command prints Text-files.

❑ **SILICON SALAD ($24.95)** Hi-Res Program Splitter, Disk Scanner, Disk Killer—more. With *Command Chart*.

❑ **TIP DISK #1 ($20.00)** 100 Beagle Tip Book programs on disk. LIST and learn. Includes *Apple Command Chart*.

❑ **UTILITY CITY ($29.50)** 21 useful Utilities. List Formatter, Multi-Column Catalogs, Trick Filenames... LIST and learn!

AT YOUR APPLE DEALER NOW!
Or, if you live in the Boonies, buy directly from BEAGLE BROS:

Visa, MasterCard or COD (orders only)
Phone Toll Free, All 50 states, 24-Hours:
1-800-227-3800 ext.1607
Or mail U.S.Check, Money Order
or Visa/MasterCard numbers to:
BEAGLE BROS, Dept. B
3990 OLD TOWN AVE, Suite 102C
SAN DIEGO, CALIFORNIA 92110
Add $1.50 shipping, +6% if Calif., +$3 if COD, +$4 if overseas
—ALL ORDERS SHIPPED IMMEDIATELY—

It all adds up...

IBM

MAI

General Ledger ..... CALL
Accounts Payable ..... CALL
Accounts Receivable ..... CALL
Payroll ..... CALL
Inventory ..... CALL

MICROPRO

WordStar Professional Pack $389.00

MICROMIN

R:Base 4000 ..... $329.00

MULTIMATE INT.

Multi Mate $289.00

MICROSTUF

[illegible] ..... $[illegible]

MICROSOFT

[illegible] $139.00

ASHTON-TATE

Framework $439.00
dBASE II upgrade $149.00
dBASE II $299.00
dBASE III $439.00
Friday! $179.00

IUS

[illegible] $249.00
[illegible] $149.00
[illegible] $259.00

CONTINENTAL SOFTWARE

1st Class Mail/Form Letter $79.99
Home Accounting Plus $66.99

LOTUS

Symphony $549.00
1-2-3 ..... $319.00

PROFESSIONAL SOFTWARE

[illegible] $299.00

SYNAPSE

[illegible] $89.99

SOFTWARE

	C-64	Atari	IBM	Apple
Electronic Arts				
One on One	$29.99	NA	$29.99	$29.99
Music Construction	$29.99	$29.99	$29.99	$29.99
Pinball Construction	$29.99	$29.99	$29.99	$29.99
Cut & Paste	$39.99	$39.99	$39.99	$39.99
[illegible]	$29.99	$[illegible]	$[illegible]	$[illegible]
[illegible]	$29.99	$[illegible]	$[illegible]	$[illegible]
[illegible]	$29.99	$[illegible]	$[illegible]	$[illegible]
[illegible]	$29.99	$[illegible]	$[illegible]	$[illegible]
Planetfall	$29.99	$29.99	$29.99	$29.99
Enchanter	$29.99	$29.99	$29.99	$29.99
Suspended	$29.99	$29.99	$29.99	$29.99
Sorcerer	$29.99	$29.99	$29.99	$29.99
Zork I,2,3 ea	$27.99	$27.99	$27.99	$27.99
Atari Soft				
[illegible]	$[illegible]	$29.99	$29.99	$29.99
[illegible]	$[illegible]	$54.99	$[illegible]	$[illegible]
[illegible]	$[illegible]	$34.99	$[illegible]	$[illegible]
[illegible]	$[illegible]	$29.99	$[illegible]	$[illegible]
[illegible]	$[illegible]	$[illegible]	$[illegible]	$[illegible]
Donkey Kong	$34.99	NA	$[illegible]	$[illegible]
DynaTech				
Code Writer	$78.99	$79.99	$[illegible]	$[illegible]
VisiCorp				
VisiCalc	$159.99	$159.99	$159.99	$159.99
pfs				
[illegible]	[illegible]	NA	$49.99	$49.99
[illegible]	[illegible]	[illegible]	$[illegible]	$[illegible]
[illegible]	[illegible]	[illegible]	$[illegible]	$[illegible]
[illegible]	[illegible]	[illegible]	$[illegible]	$[illegible]
The Learning Company				
Magic Spells	$22.99	$22.99	$22.99	$22.99
Word Spinner	$22.99	$22.99	$22.99	$22.99
Bumble Games	$22.99	$22.99	NA	$22.99
Addition Magician	$[illegible]	NA	$22.99	$22.99
Reader Rabbit	$24.99	NA	$24.99	$24.99
Call on Utilities				

PRINTERS

AXIOM

AT-100 Atari Interface Printer $199.00
GP-100 Parallel Interface $159.00
GP-550 Atari Bidirectional $319.00
GP-700 Atari Color Printer $459.000
[illegible] Parallel Printer $269.00

NEC

[illegible] ..... $[illegible]
Gorilla Banana $149.00
Prowriter 8510P $379.00
Prowriter 1550P $599.00
A10 (18 cps) Son of Starwriter $569.00
Hot Dot Matrix ..... CALL
F10-40 Starwriter $999.00
F10-55 Printmaster $1349.00

COMREX

[illegible] ..... $[illegible]
CR-1 Letter Quality $449.00

DIABLO

620 Letter Quality $949.00
630 Letter Quality $1749.00

DAISYWRITER

2000 ..... $999.00

EPSON

RX-80, RX-80FT, RX-100 ..... CALL
FX-80, FX-100 ..... CALL
LQ-1500 ..... CALL

IDS

Prism 80 For [illegible] ..... $[illegible]
Prism 132 For [illegible] ..... $[illegible]

JUKI

6100 ..... $489.00

OKIDATA

82, 83, 84, 92, 93, 2350, 2410 ..... CALL

AMDEK

300 Green $149.00
300 Amber $159.00
310 Amber $269.00
Color I Plus $399.00
Color 2 Plus $399.00
New Color 300,400,500,600,700 ..... CALL
Color 4T IBM $599.00

BMC

1201 (12" Green) $65.99
1201 Plus (12" Green Hi Res) $99.99
[illegible] ..... $[illegible]

GORILLA

[illegible] ..... $[illegible]
[illegible] ..... $[illegible]
[illegible] ..... $[illegible]

NEC

JB 1206 Green $109.00
JB 1201 Green $149.99
JB 1205 Amber $159.99
JB 1215 Color $259.00
JC 1215 RGB $429.00
JC 1460 Jnr $569.00

PRINCETON GRAPHICS

MAX 12 ..... $[illegible]
MAX 14 ..... $[illegible]
[illegible] ..... $[illegible]

ANCHOR

Volksmodem $59.99
Mark II, Serial $79.99
Mark VII (Auto Ans/Auto Dial) $89.99
Mark XII (1200 Baud) $259.99
Mark 212-80 ..... $99.99
9 Pin Power Supply $79.99

HAYES

Smartmodem 300 ..... $199.00
Smartmodem 1200 ..... $469.00
Smartmodem 1200B $449.00
Micromodem IIe $269.00
Micromodem 100 ..... $299.00
Smart Com II $89.99
Chronograph $199.00

MANNESMAN TALLI

160L $569.00
180L $799.00
Spirit 80 ..... $259.00

NEC

[illegible] ..... $[illegible]
Pinwriter ..... CALL
[illegible]30 ..... $749.00
[illegible]30 ..... $1368.00
[illegible] $1799.00

OLYMPIA

Compact 2 ..... $469.00
Compact RO $499.00
ESW 3000 ..... $1399.00

SMITH CORONA

[illegible] ..... $[illegible]
Typ[illegible] ..... $[illegible]
Typ[illegible] ..... $[illegible]

SILVER REED

500 Letter Quality $399.00
550 Letter Quality $469.00
770 Letter Quality $569.00

STAR

Gemini 10X $279.00
Gemini 15X $369.00
Gemini Powertype L Q $389.00
Serial Board $75.00
Radix 10 ..... $599.00
Radix 15 ..... $699.00

TOSHIBA

P-340 ..... $629.00
1351 ..... $1449.00

TRANSTAR

120P $469.00
130P $649.00
315 Color $469.00

MONITORS

SAKATA

SG-1000 Green $249.00
SA-1000 Amber $199.00
SC-1000 RGB $479.00

TAXAN

210 Color RGB $269.00
400 Med Res RGB $319.00
415 Hi Res RGB $469.00
420 Hi Res RGB (IBM) $469.00
100 12" Green $125.00
105 12" Amber $135.00

USI

[illegible] $99.00
[illegible] $139.00
[illegible] $129.00
[illegible] Amber $119.00
1400 Color $269.99

QUADRAM

Quadchrome 8400 Color $499.00

ZENITH

ZVM 122 Amber $99.99
ZVM 124 Green $89.99
ZVM 124 Wht Amber $149.00
ZVM 3 ..... $[illegible]
ZVM 131 ..... $429.00
ZVM 135 RGB ..... $[illegible]
ZVM 136 RGB/Composite $469.00

MODEMS

NOVATION

J-Cat $99.99
Cat $139.00
Smart Cat 103 ..... $179.00
Smart Cat 103/212 ..... $399.00
[illegible] ..... $[illegible]
[illegible] $549.00
Apple $249.00
Apple 212 ..... $449.00
Apple Cat 212 Upgrade $289.00
Smart Cat Plus $369.00

ZENITH

ZT-1 ..... $339.00
ZT-10 ..... $309.00
ZT-11 ..... $369.00

COMPUTER MAIL ORDER

west

MasterCard

800-648-3311

In NV call (702)588-5654, Dept. 112
Order Status Number: 588-5654
[illegible]
Reno, NV 89449

canada

Ontario/Quebec 800-268-3974
Other Provinces800-268-4559
In Toronto call (416)826-0866,Dept. 112
Order Status Number: 826-0866
[illegible] Dunwin Drive (Unit B)
Mississauga, Ontario Canada L4[illegible]

east

VISA

800-233-8950

In PA call (717)327-0676, Dept. 112
Order Status Number: 327-0676
[illegible] 327-1[illegible]
877 E. [illegible] W. Williamsport, PA 17[illegible]

No risk, no deposit on C.O.D. orders and no waiting period for certified checks or money orders. 4 1/2% $[illegible] shipping and handling on all orders. Larger shipments may require additional charges. NV and PA residents add sales tax. All items subject to availability and price change. Call today for our catalog.

the best prices

ZENITH data systems

PC COMPATIBLE
16 BIT SYSTEMS
Call for price and configurations

APPLE/FRANKLIN DISK DRIVES
MICRO-SCI

A2	$[illegible]

RANA

Elite 1	$399.00
Elite 2	$489.00
Elite A	$589.00

INDUS

GT Drive (Apple)	$249.00

SANYO

MBC 550	CALL
MBC 550-2	CALL
MBC 555	CALL
MBC 555-2	CALL

HEWLETT PACKARD

HP 71B	$419.99
41CV	$159.99
41CX	$349.99
HP 11C	$62.99
HP 12C	$92.99
HP 15C	$92.99
HP 18C	$92.99
HP 75D	$879.99
Mod[illegible]	$99.99
[illegible]	$[illegible]
[illegible]	$[illegible]
[illegible]	$[illegible]
Module	$99.99

DISKETTES

MAXELL		ELEPHANT	
5¼" MD-1	$21.99	5¼" SS/SD	$17.99
5¼" MD-2	$29.99	5¼" SS/DD	$21.99
8" FD-1	$39.99	5¼" DS/DD	$28.99
8" [illegible]	$49.99		

DISK HOLDERS

VERSATIM		INNOVATIVE CONCEPTS	
[illegible]	$26.99	Flip-A-File 10	$3.99
[illegible]	$4.99	Flip-A-File 50	$17.99
BIB		Flip-A-File 50 w/lock	$24.99
5¼" Disk Head Cleaner	$14.99	Flip-A-File (400/800 ROM)	$17.99

Koala

Atari (ROM)	$79.99	IBM	$99.99
C-64 (ROM)	$79.99	Apple/Franklin	$89.99

FRANKLIN

ACE 1000 Disk Drive	CALL
ACE 1200 Disk Mgmt System	CALL
ACE PORTABLES	CALL

APPLE

APPLE IIc STARTER PACK
Apple IIc, Disk Drive & Controller, [illegible] Monitor II & DOS 3.3

COMPLETE	CALL
APPLE IIc	CALL
APPLE IIc	CALL
MacINTOSH	CALL

SHARP

PC-1500A	$199.99
PC-1500A	$88.99
CE-126 Printer/Cassette	$126.99
CE-150 Color Printer Cassette	$171.99
CE-151 4K RAM	$29.99
CE-[illegible] 8K RAM	$49.99
CE-[illegible] 8K RAM	$[illegible]
CE-[illegible] ROM [illegible]rary ex	$29.99

NEC

NEC [illegible] Thermal Printer	$149.99
[illegible] Acoustic Coupler	$99.99
[illegible] 0K 8K RAM - bips	$105.00
[illegible] PC-8201A 32K RAM Cartridge	$389.00

ATARI

WHILE SUPPLYS LAST

600XL	$129.00
800XL	$219.00
1200XL	$249.00

850 Interface	$159.00
1010 Recorder	$71.99
1020 Color Printer	$219.00
1025 Dot Matrix Printer	$289.00
1027 Letter Quality Printer	$269.00
1030 Direct Connect Modem	$99.99
1050 Disk Drive	$349.00
1064 Memory Module	$[illegible].00
Touch Table Software	$64.99
Light Pen/Software	$79.99
CX22 Track Ball	$39.99
7097 Atari Logo	$74.99
4016 Pilot (Home)	$57.99
408 Pilot (Educ.)	$99.99
8038 Atari Pilot	$77.99
5049 VisiCalc	$139.99
488 Communicator II	$119.99

CX30 Paddles	$11.99
CX40 Joystick	$7.99
4011 Star Raiders	$31.99
4022 Pac Man	$31.99
4025 Defender	$31.99
8086 Dig Dug	$31.99
8031 Donkey K[illegible]	$31.99
8034 Fax [illegible]	$[illegible].99
8040 Donkey K[illegible]	$33.99
8043 Mr Do	$37.99
8044 Joust	$37.99
8045 Fenge	$33.99
8082 Moon Patrol	$33.99
4003 Assembler	$44.99
8126 Microsoft Basic I or II	$64.99
Super Sketch Graphics Board	$39.99

MEMORY BOARDS

ATARI		APPLE/FRANKLIN	
Axlon 32K	$89.99	Axlon 128K	$299.00
Axlon 48K	$99.99	Axlon 320K	$549.00
Axlon 168K	$299.00		

DISK DRIVES FOR ATARI

INDUS	
GT Drive (Atari)	$379.00
RANA	
1000	$299.00
TRAK	
AT-D2	$389.00
AT-[illegible]	$[illegible].00

commodore

CBM 8050	$938.00	SX-64 Portable	$539.00
CBM 8096	$889.00	CBM 64	$199.00
CBM 9000	$999.00	C1541 Disk Drive	$249.00
B128-80	$789.00	C1530 Datasette	$69.99
8038 to 9000 Upgrade	$499.00	C1520 Color Printer/Plotter	$129.00
8061 CP/M Disk Drive	$299.00	M-801 Dot Matrix Printer	$419.00
8050 Disk Drive	$999.00	1526 [illegible] Matrix	$299.00
8250 Disk Drive	$1249.00	1702 M[illegible]	$[illegible].00
4023 Printer	$399.00	1351 Joystick	$14.99
8023 Printer	$589.00	1312 Paddles	$[illegible].99
6400 Printer	$1449.00	C1600 VIC Modem	$89.99
2 RAM	$369.00	Logo 64	$49.99
Silicon Office	$499.00	Pilot 64	$39.99
The Manager	$199.00	Word Pro 64 Plus	$59.99
SoftROM	$185.00	Calc Result 64	$59.99
VisiCalc	$149.00	Calc Result [illegible]	$59.99
		M[illegible]	$[illegible].99

PRECISION SOFTWARE

Superbase 64	$69.99

PROFESSIONAL SOFTWARE

Word Pro 3 Plus	$169.00
Word Pro 3 Plus	$189.00
Word Pro 4 Plus/5 Plus each	$279.00
Info Pro	$179.00
Administrator	$399.00
Power	$79.99

DPP [illegible]	$[illegible].99
Mail [illegible]	$[illegible].99
Desk Organizer [illegible]	$49.99
Vidtex Telecommunications	$34.99
Super Sketch Graphics Board	$39.99

MED DISK DRIVES

SD1 Disk Drive	$349.00
SD2 Disk Drive	$599.00

COMPUTER MAIL ORDER

west
800-648-3311
In NV call (702)588-5654, Dept. 112
Order Status Number: 588-5654
P.O. Box 6689
Stateline, NV 89449

canada
Ontario/Quebec 800-268-3974
Other Provinces800-268-4559
In Toronto call (416)828-0866, Dept. 112
Order Status Number: 828-0866
2806 Dutwin Drive, Unit 3B
Mississauga, Ontario, Canada L5L1T7

east
800-233-8950
In PA call (717)327-9575, Dept. 112
Order Status Number: 327-9576
Customer Service Number 327-1450
477 E 3rd St. Williamsport PA 17701

[illegible] to prices [illegible] to shipping, tax and [illegible] of [illegible] situations. Call for exact pricing [illegible] Canada. INTERNATIONAL ORDERS: Orders placed with U.S offices for delivery outside the Continental United States must be pre-paid by certified check only. Include 3% (minimum $5) shipping and handling. EDUCATIONAL DISCOUNTS: Additional discounts are available to qualified Educational Institutions. APO & FPO: Add 3% (minimum $5) shipping and handling.

CIRCLE 115 ON READER SERVICE CARD

A Big Printer, A Tiny Printer, and A Spooler

Print About Printers

John J. Anderson

Time to put yourself online and dump that buffer. Let's engage in a little hard copy concerning hard copy, okay? Form feeding requires some care, you know. You can't just go around line feeding here and there and always expect to come out at the top of form. That's why we're here.

The warm weather is beginning to wind down in our neck of the woods, and that means just one thing; got to start thinking about stocking up on fan-fold and ribbons. It might be a long winter.

We'll take a look at the Datasouth DS 220 this time around, and catch up a bit on our new products buffer. We'll also reach into the mailbag—so make yourself cozy.

Going Datasouth

When it comes to premium quality printers, we are rather fanatical here at the lab. If you are going to spend big bucks, you want perfection. Otherwise you might as well go the discount route. Over $1000? Better do things right.

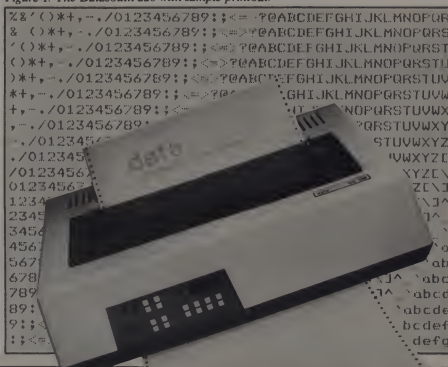
Though the looks of the DS 220 are somewhat reminiscent of an old Frigidaire, the similarity is only skin deep. The Datasouth 220 is a premium quality machine. It offers bidirectional logic-seeking dot matrix print at 220 cps draft quality, so-called "memo-quality" at 100 cps, and near-letter quality at 40 cps. Up to eight different character font and pitch styles may be selected. In addition, the DS 220 offers seven resident international character sets and can accept up to 94 user-defined characters that can be downloaded from the host and stored in non-volatile memory.

The 94 ASCII character set is printed in 9 x 7 matrix in draft mode, 9 x 15 matrix in memo mode, and 18 x 48 matrix in near-letter quality mode. True lowercase descenders and simultaneous underlining are possible because of the nine-wire printhead. The printhead is rated at over a half-billion characters, and can be replaced on-site in a matter of minutes.

An adjustable head-to-platen gap accommodates forms up to six parts in thickness. Fanfold forms from 3 to 15 inches may be fed through the front or bottom of the printer. Manual single sheet feed is possible through the front paper feed, as pinch rollers are incorporated into the paper tractors. The cartridge ribbon is simple to change, and is rated at over 3 million characters.

The most unique facet of the DS 220 is its programmable control panel. LED indicators, a four-character digital display, and a custom keypad make format set-up quick and simple. A non-volatile

Figure 1. The Datasouth 220 with sample printout.



WHAT A RAGING FIRE TAUGHT US ABOUT RELIABLE PERSONAL PRINTERS.

That's a printer? We've always known that Okidata makes the toughest printers, but Robert Brannon really proved it. A fire left his Microline 92 looking more like a pile of charred Silly Putty® than a printer, but being an optimist, Mr. Brannon took it to his Okidata dealer to see if anything could be salvaged.

The service department at Wolff Computers in New York City wasn't quite as optimistic, especially when they saw that the heat of the blaze had actually melted the casing and molded the plastic onto the internal workings of the printer.

But willing to try anything once, they plugged the unit into one of their computers, snapped on the print mode, tapped the printhead lightly, and Robert Brannon's smokey, burned, half-melted Okidata did just what it had always done . . . it printed. It printed fast and it printed beautifully.

Red-hot performance. We're not surprised. The durability of Okidata printers has become downright legendary. With a printhead that lasts well beyond 200,000,000 characters and a warranty claim rate of less than 1/2 of 1%.

Okidata speed and versatility have become famous as well. The Microline models print data at rates up to 200 characters per second. That's three pages a minute. There's an additional print mode for enhanced or emphasized text. And their letter quality rivals a daisywheel for clarity with full graphics printing capabilities.

Okidata printers are fully compatible with all popular software packages and personal computers. Special configurations are available for IBM and Apple Macintosh™ at no extra cost. And if you're like Mr. Brannon and occasionally need a little service, it's easy to find at Xerox Service Centers nationwide.

Every now and then any printer can have a rough day, but the Okidata Microline printers are built to take it. Call 1-800-OKIDATA (609-235-2600 in NJ) for the Authorized Okidata Dealer nearest you. Okidata, Mt. Laurel, NJ 08054.

OKIDATA

an OKI AMERICA company

Technological Craftsmanship.

Macintosh is a trademark of Apple Computers Inc

Silly Putty is a registered trademark of Binney & Smith Inc

CIRCLE 167 ON READER SERVICE CARD

Now you can get personal with a Datasouth.

Say hello to the Datasouth Personal Printer—an office-quality printer that makes itself right at home next to your personal computer.

Technically speaking, the Personal Printer is "Epson compatible." But it's better than the competing Epson because it also does letter-quality printing.

Personally speaking, the Personal Printer is "checkbook compatible." So you don't have to sacrifice the money you need to get the printer you want. And it comes in two models—one with a 10-inch and one with a 17-inch carriage.

Make a personal visit to your local computer store, and bring home legendary Datasouth performance for an affordably personal price. The Personal Printer. Only from Datasouth.

personal

datasouth

HIGH PERFORMANCE MATRIX PRINTERS

Find Datasouth Printers At Participating ComputerLand® Stores And Other Fine Dealers.

Datasouth Computer Corporation
Box 240947 · Charlotte, NC 28224
704/523-8500 · Telex 6843018 DASOU UW

CALL TOLL FREE
1-800-222-4528

CIRCLE 122 ON READER SERVICE CARD

memory retains the settings when power is turned off.

The unit offers serial and parallel interface as standard, along with a 2K buffer. Of course, the DS 220 can also be programmed through software escape codes.

As you might imagine, an impact printer racing along at 220 cps is not the quietest thing in the world. Despite the size and acoustic sealing of the unit, we were disappointed in its raspiness. Still, it would be unfair and inaccurate to compare it to quieter models that don't reach half the speed.

Otherwise, we were quite pleased with the DS 220. It is really fast, and print quality, even in the draft mode, is quite acceptable (Figure 1). The unit qualifies as a truly smart printer—more than 50 separate functions can be coded into the control panel—and remembered by the DS 220.

We didn't get to see the final documentation at press time, so we can't comment on it. The preliminary documentation we did see was adequate.

Rumor has it that IBM has chosen to OEM the DS 220. If they have, we can certainly understand why. The DS 220 may not look like a thoroughbred, but it is a heavy-duty workhorse, designed for maximum throughput in minimum time.

The DS 220 lists for $1695. The DS 180, with maximum print speed of a very respectable 180 cps, lists for $1395. Both models are well worth the investment.

TTX—Big Little News

TTXpress, the smallest self-contained 80-column printer on the market, has begun reaching retailers. At 11" x 4.5" x 1.75", it fits in even a small camera case. It is designed to work with all popular handheld, portable, and transportable computers.

Nearly more incredible than the diminutive size of the TTXpress is its retail list price of $229. That will make it irresistible to many portable computer owners. Self-contained battery operation (4 alkaline C cells) will power the TTX for up to 5000 lines away from AC power. Of course, an AC adapter is available.

The unit is capable of producing legible 7 x 9 dot matrix hard copy at speeds up to 50 cps (40 cps under battery power). Figure 2 is a sample printout. Condensed printing enables users to produce readable 132-column spreadsheets and other extra-wide printouts on standard 8.5" x 11" paper. Other print modes include bold or double-strike, underline, shadow, and true descenders. It can also produce graphics, at a resolution of 72 dots per inch horizontally and vertically.

As it is a thermal printer, the TTXpress requires special thermal paper to operate. It can handle roll or cut sheet thermal paper with friction feed. A Centronics parallel interface is standard, compatible with Epson MX-80 control codes.

We hope to present a hands-on evaluation of the unit as soon as one arrives at the lab.

TTX also offers a new non-portable low-cost daisywheel printer. Features of the TTX Plus include proportional spacing, internal motor-driven tractor feed, a Diablo compatible 630 interface, and two-color ribbon capability. At $599, the Plus joins the TTX 1014 daisywheel in the TTX product line. The 1014 has been reduced to a list price of $499, making it among the least expensive daisywheel printers around. At the same time, TTX has reported a failure rate of less than .5 percent on the model 1014.

Both models sport wide 15" platens, bidirectional logic-seeking, interchangeable 100-character printwheels, and print speeds of 14 cps. A $399 sheet feeder is also available for both models.

TTX has also announced TTX Macpac, for the Macintosh computer. This system combines a TTX 1014 with a 64K buffer, also accessible by the Imagewriter. It includes all cabling, at a list price of $895.

Extended Systems ShareSpool

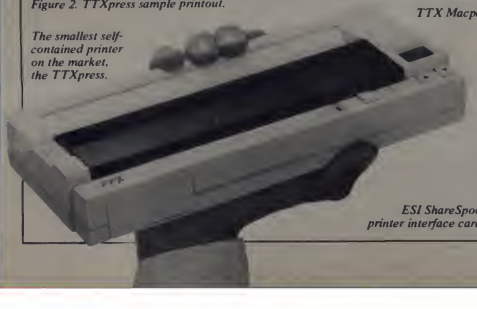
Extended Systems has announced the ESI-2012 and ESI-2014 IBM PC and PC-compatible spooler cards, which allow up to three personal computers to share one printer. The ShareSpool cards act as intelligent printer interfaces, automatically buffering and managing print output. Each requires only one full length option slot in an IBM PC/XT, and no XT "think" time is required. Each user appears to "own" the shared printer exclusively.

The model ESI-2014 ShareSpool offers the ability to share a parallel interfaced printer with up to three personal computers. It appears as a printer interface adapter to the XT, while accepting parallel output from two additional XTs. When print data is first received from an attached computer, a "job" is opened for that computer—and all print data received from that computer are tagged for that "job." The job is closed when no data have been received for ten seconds.

```
I CAN PRINT FOR UP TO 120 MINUTES ON A NEW LOAD OF BATTERIES.
You  can also use your programs right away since my control codes  are
Epson MX-80 compatible.  You may also use such popular word processing
software like Wordstar.
```

Figure 2. TTXpress sample printout.

The smallest self-contained printer on the market, the TTXpress.



TTX Macpac.

ESI ShareSpool printer interface card.

Print jobs are executed on a first in-first out basis, and the ESI-2014 can accept and buffer print data from all three computers at the same time.

The ESI-2012 ShareSpool functions like the ESI-2014, except for serial output. Both units are equipped with 64K of spooler buffer space, expandable to 128K. They are priced at $595 each.

Delta Doc Revisited

The following is a letter I received from Eric van Hall of Star Micronics:

I read with a great deal of interest your article concerning our Delta-10 printer in the June issue of *Creative Computing*. Thank you very much for a very fair and unbiased representation of our product.

I noted your comment concerning the user's manual. Indeed the manual accompanying your printer was "preliminary." Quite often, because we demand that such high quality documentation accompany our product, the time involved to produce such documentation exceeds the introduction date for the product. Because there are occasions when the end-user receives only the preliminary manual, our policy is to mail, at no charge to the end-user, the final user manual when it becomes available.

I am enclosing, for your inspection, the final user's manual for the Delta currently being supplied with the printer. This manual is an example of Star's commitment to quality documentation; hopefully it is the best in the industry.

That's quite a claim, but after looking through the final product, I must agree. It will be my pleasure to hold up the final documentation of the Delta-10 as the standard to which all printer documentation should aspire. Truly a superlative job.

Time for just one more response to a question from the mailbag:

To Dwight Garner, of Wheaton, IL: The decision whether or not to take out a service contract is analogous to buying personal insurance. You can go without it, and then suddenly require a very costly repair. Or you can take out an extensive contract and never have a problem.

There was a time when I would have recommended service contracts on printers without reservation, because they are the most likely component of any computer system to require repair. However, nowadays most quality printers can run for years without requiring a service call.

Determine what your actual duty cycle is. Just how much hard copy do you actually require? As a rough rule of thumb, if you churn out an average of fewer than three pages a day, you probably don't need a service contract. You aren't using your printer all that much.

Instead, I would stress the routine preventive maintenance you can undertake yourself to keep your printer up and running. Keep the inside clean with an air bulb and brush. Make sure the paper path is free of torn bits of paper and paper dust. Keep moving parts well-lubricated (I keep a can of WD-40 nearby).

Talk to you next month. ■

Firms Mentioned in this Column

Datasouth Computer Corporation
Box 240947
Charlotte, NC 28224
(704) 523-8500

TTX Incorporated
3420 East Third Ave.
Foster City, CA 94404
(415) 341-1300

Extended Systems
P.O. Box 4937
Boise, ID 83711
(208) 322-7163

We've Got Guts!!

Compare

Open up any competitor's model and compare it to the Isobar photo. . . You can really see the difference!

Don't be short changed by inexpensively designed "protection"!

ISOBAR: The Most Advanced Power Line Filter to Protect Your Computer. . .And the ONLY surge suppressor to protect your system from itself!

Only Isobar gives you:

1. 17 active electronic filtering components to REALLY protect your computer system.
2. Individual filter banks with multiple filtering components to safeguard against any interaction between their C.P.U. and printer.
3. Superior RFI/EMI noise suppression and rejection.
4. U.L. listed, AC surge suppressor with full recognition by Underwriters Laboratory not just as an extension cord or spike suppressor but also as an electronic noise suppressor.

What does full Isobar protection cost?

LIST $54.95 (two outlets)
LIST $79.95 (four outlets)
LIST $97.95 (eight outlets)

TRIPP LITE

Call 1-312-329-1777 Est. 1922
500 North Orleans St., Chicago, IL 60610

CIRCLE 198 ON READER SERVICE CARD

LAST NIGHT WE EXCHANGED LETTERS WITH MOM, THEN HAD A PARTY FOR ELEVEN PEOPLE IN NINE DIFFERENT STATES AND ONLY HAD TO WASH ONE GLASS...

That's CompuServe, The Personal Communications Network For Every Computer Owner

And it doesn't matter what kind of computer you own. You'll use CompuServe's Electronic Mail system (we call it Email™) to compose, edit and send letters to friends or business associates. The system delivers any number of messages to other users anywhere in North America.

CompuServe's multi-channel CB simulator brings distant friends together and gets new friendships started. You can even use a scrambler if you have a secret you don't want to share. Special interest groups meet regularly to trade information on hardware, software and hobbies from photography to cooking and you can sell, swap and post personal notices on the bulletin board.

There's all this and much more on the CompuServe Information Service. All you need is a computer, a modem, and CompuServe. CompuServe connects with almost any type or brand of personal computer or terminal and many communicating word processors. To buy a Starter Kit, see your nearest computer dealer. To receive our informative brochure or to order direct, call or write:

CompuServe

Consumer Information Service
5000 Arlington Centre Blvd. Columbus, OH 43220

800-848-8199
In Ohio call 614-457-0802

An H&R Block Company

CIRCLE 109 ON READER SERVICE CARD

The Only Limit
is the Boundaries
of Your Imagination
Word Processing on red, Spreadsheets on
yellow and letters home to Mom on blue.
KALEIDISKETTES™

Biofeedback and Color Photos

TRS-80 Strings

Stephen B. Gray

Checking out Route 67 on the Tandy map, we see it leads to a tired switch, the *Bio Detector* program from Computerware, two kodak systems for photographing CRT graphics, and a third short star-twinkle program.

The Tired Switch

You have just written some text with a word processing program, and you want to save it. So you type:

```
S XYZ/SCR
```

or something similar. But instead of the text being written to disk, you get this message:

```
Write Protected Disk
```

So of course you take the disk out of the drive to look at it, and of course there is no tab covering the write-protect notch, because you didn't put one there.

So what happened? With a bit of detective work, you find you have been a little lazy. Instead of taking the disk completely out of the drive at the end of a computer session, you just opened the drive door, and pulled the disk out half an inch, so the data don't get scrambled when you turn off the TRS-80.

(At least this is what we have all heard for years is supposed to happen, and all the manuals warn: "Do not place a diskette in the drive while you are turning the system on or off," or words to that effect. Do it often enough, though, and you'll have trouble booting up Basic, or your word processing program, or whatever is on the disk.)

Leaving a disk partially out of the drive is a fairly common practice. We do it often when we use one disk more than the others; we leave it in the drive because it is probably going to be used at the next session.

There is a little microswitch inside the drive that senses whether the write-protect notch is covered or not. Listen as you push a disk into the drive: the microswitch clicks on as it detects the far end of the disk jacket; then clicks off as it drops into the notch (assuming there is no tab covering the write-protect notch).

After several years, the computer has no way of telling the difference between a tired notch switch and a write-protect tab.

Now pull the disk forward half an inch; the microswitch clicks on, and it will stay on for hours, or maybe days, until you push the disk forward again.

These microswitches are guaranteed by the manufacturer to operate may thousands of times without error. But just figure out how many times you click that switch in a week. After several years, the write-protect switch is going to get a little tired, and if you insist in leaving it in the on position, it may just decide to stay that way. Which is why you get the Write Protected Disk message; the computer has no way of telling the difference between a tired notch switch in the on position and a write-protect tab.

The next time you turn off your TRS-80 (or any other computer), take the disk all the way out of the drive first. Otherwise you may eventually have to take your machine to a Radio Shack Computer Center to have the microswitch replaced. The current cost of that operation is $30.

Bio Detector

You've probably read or heard about bio feedback monitoring, how it can measure the stress you're feeling, and how you can use it to lower your stress level.

Bio Detector from Computerware is a $34.95 combination of hardware and software that graphs your galvanic skin response on the screen of a 16K Color Computer.

The hardware consists of a Velcro-mounted, adjustable skin sensor with silver contacts, attached to a small "monitor box," which plugs into the joystick jack of your Color Computer. First you load the Biograf program from tape as you wrap the sensors around the first two fingers of one hand.

Then you set four variables, which are displayed on the bottom of the screen. The Scope speed can be set to slow, medium, or fast. The Trace can be displayed as a line or as dots, whichever you prefer. Audio can be turned off, or set to variable (a changing tone that gets

MICROMAIL™

HOBBYIST SPECIAL

PRICES AND AVAILABILITY SUBJECT TO CHANGE WITHOUT NOTICE

IBM PC COMPATIBLE KIT AVAILABLE.

Complete CPU Board with 64 KB Memory. Runs DOS CP/M86 and more $399

Parallel Port extra ..... $59 Serial Port $69

Assembled complete: Chassis with Cover, Fan, Power Supply, Filter, AC Outlet, Power Cord, Speaker $399

Power Supply 100 Watts $120
Floppy Drive Controller $139
Monochrome Card $159
Color Graphics Card $159
½ Height DSDD Floppy 320 KB Disk Drive $159
RAM Chips Kit 64K ..... $ 49
Nice Soft Touch IBM Compatible Keyboard $120
MS DOS 2.1 ..... $ 60
GW Basic ..... $ 60

IBM PERSONAL COMPUTER

Special of the Month!

IBM PC* COMPLETE LINE

256K RAM, 360KB Disk Drive, FDC, Video Monitor & Adaptor 10MB Hard Disk Sub-System **$2999**

Hard Disk for IBM PC Complete Sub-System Internal 10MB H. Winchester Drive $875

TAVA PC AVAILABLE

PRINTERS

OKIDATA 82 120 cps	CALL
OKIDATA 92 160 cps	CALL
OKIDATA 93 160 cps	CALL
OKIDATA 84 200 cps	CALL
EPSON FX 80 160 cps	$499
EPSON FX 100-160 cps	CALL
NEC 3550	$1899
DYNAX DX-15 13 cps	$450
BROTHER HR-1 16 cps	$599
BROTHER HR-25 23 cps	$749
GEMINI 10X 120 cps	CALL
GEMINI 15X 120 cps	CALL

DISK DRIVES

SLIM LINE TEAC 55-B	$169
TOSHIBA	$169
PANASONIC	$169
FULL SIZE TANDOM TM 100-2	$179

PERIPHERAL CARDS

AST SIXPACK PLUS 64K	$299
MEGA PLUS 64K	$299
I/O PLUS-1s, 1p, c	$190

PERIPHERAL CARDS

GAME/SERIAL/PAR	$39
64K MEMORY	$50
MONOGRAPHIC	CALL
HERCULES GRAPHICS CARD	$369
PLANTRONICS COLOR PLUS	$439
QUADRAM COLOR II	CALL
PARADISE MULTI-DISPLAY	$489
20MB BACK UP TAPE SYSTEM	$1599

MONITORS

AMDEK 300G	$149
300A	$159
310A	$169
PRINCETON HX-12	$490
SR-12	CALL
MAX-12A	CALL
ROLAND MB-122G	$139
MB-122A	$149
COLORMASTER By TAVA™	$459

MODEMS

HAYES 1200B	CALL
1200	CALL
300	CALL

MICROMAIL
16861 Armstrong Ave., Irvine, CA 92714

(714) 838-9100

*IBM is a registered trademark of IBM ...

CIRCLE 160 ON READER SERVICE CARD

Figure 1. This trace, on the Bio Detector display, shows a relaxed period on the left, and higher stress at right (from holding my breath.)

Figure 2. The Anxiety Attack game is a real challenge; the higher sensitivity makes it almost impossible to relax enough to flatten the trace appreciably.

higher as the trace gets higher) or fixed (a beep that sounds more often as the trace gets higher). Mode may be set to Bio (the bio feedback mode) or to AA (for the Anxiety Attack game).

Although the manual dosen't mention it, you use the spacebar to stop the trace, so you can change any of the settings, which depend largely on personal preference; I like a slow line-trace, with variable beep.

How It Works

Bio Detector measures skin resistance and converts this to an analog signal, shown on the screen in an elaborate and colorful display (Figure 1). According to the theory, the more stress, the higher the numbers sent to the computer. *Bio Detector* is said to "help you learn to lower your personal stress level, to observe your reaction to questions or other stimuli. . . It can also be used as a simple lie detector."

As the plotting starts, you adjust the sensitivity control on the monitor box until the trace is near the middle of the screen, vertically. This is the most important adjustment; too high or too low, and the trace flattens out.

To check the operation of the *Bio Detector*, take a deep breath and hold it for as long as you can; this causes stress, and the trace on the screen should rise dramatically.

According to the manual, bio feedback means amplifying any function of your body, to make yourself aware of something you ordinarily might not be aware of. You could, for example, amplify your heartbeat, and then learn to speed it up, or slow it down, at will. The *Bio Detector* measures skin resistance, which is inversely proportional to body stress. The amount of stress it senses is displayed on the screen and heard as a changing tone, so that you can learn to lower (or raise?) your "personal stress level."

The manual claims that "bio feedback has been used to cure people with chronic headaches, ulcers, and many other stress-related problems. People with high stress jobs have learned to relax and deal with their work without as much tension." No suggestions are given on how to relax.

Personally, I found that, with a little practice, I could lower the trace level a fair amount, but not always when I wanted to.

The *Bio Detector* can be accessed from a Basic program, because the Color Computer sees it as a joystick. If the Detector is plugged into the right joystick jack, look at JOYSTK(0). A four-line Basic program is provided to let the computer look at the right joystick port and "make an appropriate tone."

Lie Detector

Put the skin sensor on another person's fingers, allow him some time to relax, then ask a question. According to the manual, "if the trace does not move up or down very much, the answer was probably the truth. If the trace moves about a half an inch or so, the person may not be telling the whole truth. If the traces moves up more than an inch the answer is probably not true at all."

The manual continues with a disclaimer, "Please remember that this is not guaranteed to produce 100% accurate results. You shouldn't take the responses of the person too seriously. (We don't want to cause any divorces.)" The magazine ad goes even further: "This is a toy. Results not admissible in court."

Anxiety Attack Game

In AA mode, the computer is much more sensitive to upward movements of the trace. The idea of the Anxiety Attack game (Figure 2) is to get somebody to put on the sensor, then see if you can "get the person . . . to react. Try asking how his car got that huge scratch in it, or make a funny face. (Tickling is not fair!) Do anything you can to make the trace go up." Anything?

The manual suggests you "try this at your next party . . . to see who can hold out the longest without making the screen flash"; flashing means the display turns on and off, alternating rapidly with a blank screen. Anxiety Attack "works especially well when there are a lot of people around. This is a good test to see if you really have learned stress control in the Bio Feedback mode."

The stress level in *Anxiety Attack* is much more difficult to control than in Bio Feedback mode, because of the increased sensitivity.

Those Color Photos

The color photos illustrating the *Bio Detector* program were taken with Kodak's Instagraphic CRT Imaging Outfit, which makes instant color-print copies of images displayed on 12" or 13" CRT screens.

The Instagraphic Outfit (Figure 3), introduced in 1983, consists of two basic parts: a modified Kodamatic Champ Instant Camera with a close-up lens; and a Kodak Model 12 plastic CRT cone. Also included are two 10-exposure packages of film, a filter to provide "warmer" prints, and brackets for adapting a 35 mm

THE REAL TRICK IS GETTING OUT.

Expect the unexpected the first time you experience Infocom's interactive fiction. Because you won't be booting up a computer game. You'll be stepping into a story.

You'll find yourself at the center of an exciting world that continually challenges you with surprising twists, unique characters (many of whom possess extraordinarily developed personalities) and original, logical, often hilarious puzzles.

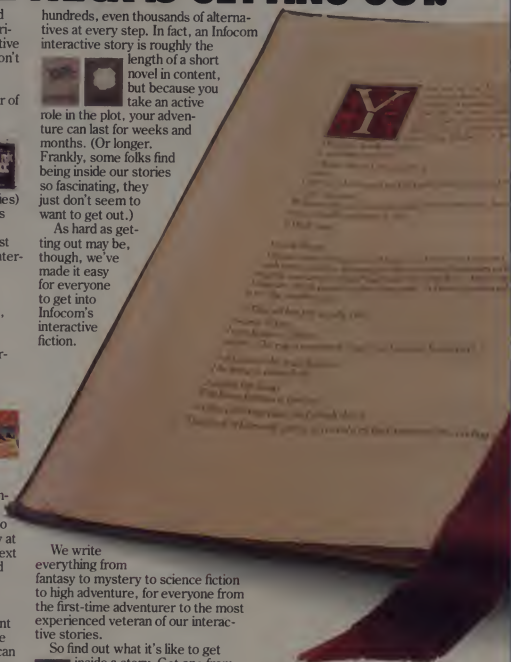
Communication is carried on just as it is in a book—in prose. And interaction is easy—you type in full English sentences.

But if you think getting inside a story is a pretty neat trick, just try getting out.

The most remarkable thing about Infocom's interactive fiction is that you become almost inextricably involved with it. That's not our opinion—it's the testimony of our customers. They tell us their pulse rates have skyrocketed and their palms have sweated as they've striven to solve the mysteries of our tales. And even when they've paused in the course of their adventures to attend to their everyday lives, their minds have continued to churn away at what the next step should be, how to alter strategy, where the ultimate solution lies.

Obsessions? Yes, but magnificent ones. For the first time, you can be more than a passive reader—you can become the story's main character and driving force. You can shape its course of events by what you choose to do. And you enjoy enormous freedom in your choice of actions—you have hundreds, even thousands of alternatives at every step. In fact, an Infocom interactive story is roughly the length of a short novel in content, but because you take an active role in the plot, your adventure can last for weeks and months. (Or longer. Frankly, some folks find being inside our stories so fascinating, they just don't seem to want to get out.)

As hard as getting out may be, though, we've made it easy for everyone to get into Infocom's interactive fiction.



We write everything from fantasy to mystery to science fiction to high adventure, for everyone from the first-time adventurer to the most experienced veteran of our interactive stories.

So find out what it's like to get inside a story. Get one from Infocom. Because with Infocom's interactive fiction, there's room for you on every disk.

Ease into interactive fiction with our Can't-Lose Sampler Offer! Watch for Infocom's new sampler disk at your favorite dealer—and get your first taste of interactive fiction for just $7.95 (suggested retail price). You've got nothing to lose (in fact, you can make a shiny new nickel in the bargain) because your Infocom sampler disk even comes with a coupon entitling you to $8 off the purchase of your first complete Infocom story, plus coupons for other exciting bonuses!

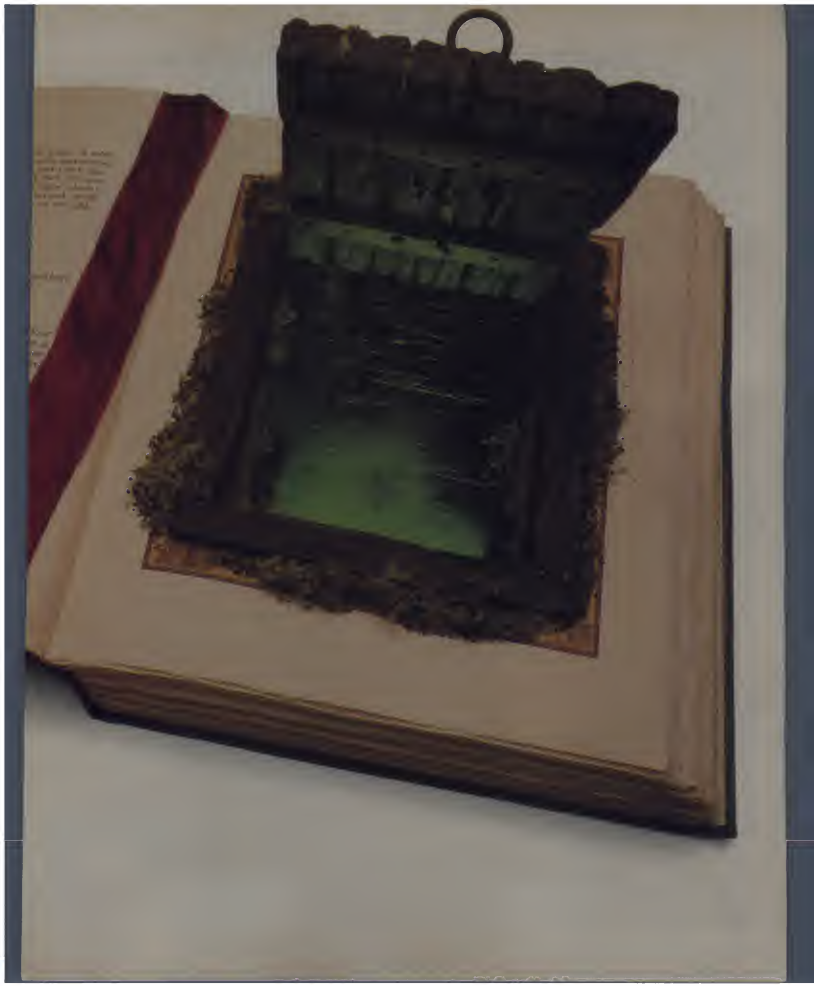
INFOCOM™

55 Wheeler St., Cambridge, MA 02138

For your Apple II, Macintosh, Atari, Commodore 64, CP/M®, DECmate, DEC Rainbow, DEC RT11, HP150 & 110, IBM PC® & PCjr, KAYPRO II, MS-DOS 2.0*, NEC APC, NEC PC 8000, Osborne, TRS-80 Color Computer, Tandy 2000, TI Professional, TI 99/4A, TRS-80 Models I & III

*Use the IBM PC version for your Compaq and the MS-DOS 2.0 version for your Wang, Mindset, Data General System 10, Grid and many others.

CIRCLE 147 ON READER SERVICE CARD

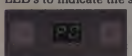


NO OTHER LETTER-QUALITY PRINTER CAN TOUCH OUR NEW SPINWRITER FOR SPEED AND EASE-OF-USE.

Introducing the Spinwriter 8850.
Our newest, and fastest, Spinwriter® printer operates at over 550 words-per-minute. And is extraordinarily easy to operate.

For one thing the Spinwriter 8850 takes care of basic settings such as pitch and forms length automatically. Of course you can also change either

one at the touch of a button. It also has a unique control panel. With large, legible alphanumeric LED's to indicate the specific operating status. And make it simple for even an unfamiliar operator to use.



UNIQUE LED DISPLAY TELLS USER EVERYTHING FROM THE FACT THAT PAPER IS OUT

TO THE FACT THE COVER IS OPEN

And, of course, the 8850 has all the features, quality and reliability that make a Spinwriter a Spinwriter.

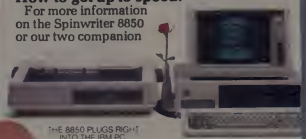
The first choice of IBM PC users.
The Spinwriter printer was the first totally plug compatible letter-quality printer available for the IBM® PC. It's still one of the few that works with all IBM PC software, as well as all other popular packages. You'll notice even its looks are compatible.

Spinwriter printers also give you capabilities you won't find on other printers. Like a selection of 80 different print styles.

And, nine easily installed forms handling options that can accelerate your printed output even more. Spinwriter printers also have an enviable record for reliability.

In fact, several years without a failure is not unusual. No wonder there are more Spinwriter printers hooked up to IBM PC's than any other letter-quality printer.

How to get up to speed.
For more information on the Spinwriter 8850 or our two companion



models, just call NEC Information Systems at: 1-800-343-4419; in Massachusetts call (617)264-8635. Also available at: Entre, 1-800-HI ENTRE; Sears Business System Centers, 1-800-228-2200; and Computerland stores. (In California) 1-800-321-1101; (Outside California) 1-800-423-3308. Find out why more and more IBM PC users are saying, "NEC and me."

Spinwriter is a registered trademark of NEC Corp. IBM is a registered trademark of International Business Machines Corp.

single lens reflex camera to the cone.

Setting up the Instagraphic is simple: load the camara; mount it on the cone; position the cone against the face of your monitor or TV screen; and hold down the shutter release until you hear a click. The click is from the camera's automatic exposure control, which adjusts the exposure time for screen brightness.

Because tube face sizes and configurations vary, the cone is designed to fit against the frame around the tube, or against the cabinet. Four rubber bumpers are mounted on the corners of the cone-flange face, to provide a nonslip contact between the cone and the CRT frame, and to space the cone flange away from the CRT frame or cabinet.

The outfit also includes foam strips for creating a light baffle between the cone flange and CRT frame. However, the strips are useful only if the room lights are to be left on while the CRT screen is photographed.

With only the bumpers applied to the cone flange, the camera will record the full area of a 12" (diagonal) CRT. With a 13" CRT, the cone will slightly crop the bowed sides of the CRT face; to show the full screen, spacer pads can be added to move the camera back. For the 13" screen of Radio Shack's color TV, four spacers were added under each bumper.

After a few trial exposures, the Instagrahic Outfit is easy to use. Once you've figured out just where to place the cone, all you do is push the button, release it when you hear the click, and wait for the color print to emerge from the camera. The 12-page manual provides plenty of detail on positioning the cone, optimizing focus, adjusting exposure, and using a 35mm camera.

According to the press release, "black-and-white duplicates of the color prints can be made with any high grade office copying machine for inclusion in written reports."

The suggested list price of the outfit is $190, although it can be bought in New York for $168, from the industrial division of one of the large camera stores.

Second-Generation Imager

Offering a selection of cones in different sizes, Kodak's second-generation Instagraphic CRT "print imager" was announced in May 1984. The modular system offers cones in 9", 12", 13", and 19" sizes.

The new print imager (Figure 4, foreground) has four basic components: a new Kodak Instagraphic camera back, box-shaped "print module," CRT cone, and cone "adapter." The background shows the four adapters, which slide into the cone, and are held in place with a pair of metal snap fasteners.

Figure 3. Kodak's Instagraphic CRT Imaging Outfit provides an inexpensive way to take photos of computer displays.

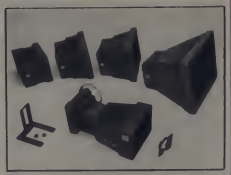


Figure 4. The new Instagraphic print imager provides four cone adapters of different sizes, to fit CRTs from 9" to 19".

A bracket is provided for using a 35 mm SLR camera in place of the camera back and print module. A filter-holder is also provided, in case the user wants to color-balance the phosphors of some CRTs.

The camera back of the new print imager is "designed for professional use," according to the press release. The new back and print module will be featured in a professional product later in 1984. The print module includes the shutter and a variable focus lens, and partially corrects for screen distortion.

The new print imager has no automatic focus control, so "one or two test exposures may be required to arrive at the best exposure for the brightness level of the particular CRT."

A close look at the photographs shows three words under the Kodak logo on the camera back and cone: Made in Germany.

Exact list prices have not been established at this writing, but the basic imager will be less than $300, and the cone adapters will be less than $40 each. The original outfit will continue to be available.

There are several other camera-and-cone systems for photographing CRT graphics, but none I've seen is as inexpensive as the Kodak Instagraphic printmakers.

Short program 51: Twinkle 3

From Ottawa, Ontario, Canada, Tammy Dunlop sent a CoCo version of the twinkle program (Nov. 1983, p. 330), with this letter:

"I finally have gone out and bought myself a TP-10 printer for my Color Computer. I'm not fussy on the thermal paper, but for the price I am willing to put up with it till I can afford something better.

"The program is one I thought of while allowing my mind to wander off work the other day. It uses an array setup to remember the pixel positions, and scanning through it gives the twinkling effect, along with a random selection of pixels on the screen that keeps changing. If you have a good imagination (like the old astronomers) you may see some of the constellations form before your eyes."

Run the program in Listing 1 on a Color Computer and 20 pixels will appear at random locations on the screen, in random colors. As soon as the 20th one appears, the stars—one by one—are randomly turned off and then right back on again, accompanied by a rapid, random note melody that may drive you bonkers within minutes. Each star disappears after several minutes (and several dozen twinkles; actually, 60 twinkles), to be replaced by another star elsewhere on the screen.

Tammy's REMs include: "Twinkle Twinkle, for TRS-80 CoCo 16K Basic. The larger the number for PIXEL, the more stars and the slower they twinkle.

Listing 1.

```
30 CLS
32 DIM AX(50),AY(50),AZ(50)
34 AP=1
36 PIXEL=20
38 TT=0
40 RESET(AX(AP),AY(AP))
50 X=RND(62): AX(AP)=X
52 Y=RND(30): AY(AP)=Y
54 Z=RND(8): AX(AP)=Z
56 SET(X,Y,Z)
60 AP=AP+1
65 IF AP>PIXEL THEN GOSUB 90
70 IF TT<>1 THEN 80
71 FOR LOOP=1 TO 4
72 FOR TW=1 TO PIXEL
73 S=RND(100)+100
74 RESET(AX(TW),AY(TW))
75 SOUND S,1
76 SET(AX(TW),AY(TW),AZ(TW))
78 NEXT TW
79 NEXT LOOP
80 GOTO 40
90 AP=1: TT=1
92 RETURN
```

SINCLAIR and TIMEX SINCLAIR programming made easy!

This program-packed book makes using your Sinclair ZX81 or Timex Sinclair 1000 fun! *Getting Acquainted With Your ZX81* lets you choose from over 70 programs, including games, math, graphs and tables, data sorting, and much more. 5½" x 8", softcover.

HOW TO ORDER:

Send check or money order for $9.95* per book, plus $2.00 postage and handling per book, to: Creative Computing Press, Dept. NI67S, 39 East Hanover Ave., Morris Plains, NJ 07950. Specify book No. ISY. Charge orders accepted, include Visa, MC or Amex card number, exp. date, name and address.

*CA, NJ, NY State residents add applicable sales tax. Outside USA add $3.00 per order

CREDIT CARD ORDERS
CALL TOLL FREE 800-631-8112!
(In NJ only 201-540-0445)

Also available at your local bookstore or computer store.

AARDVARK LTD.

THE ALL NEW STARFIGHTER IS HERE !

The Best Blasted Spacewar Game I ever saw! Multiple screens, fantastic graphics, fast action - including one of the best first person battle scenes ever done. This will put you right in the turret.

Available On: Commodore 64 Only

TAPE $24.95 DISK $29.95

VIDEO ADVENTURES™

DUNGEONS OF MAGDARR Serious D & D fantasy. 8 levels. Features 3 dimensional maze. You get a choice of wizard, fighter, or thief. Encounter monsters as the level increases. Interchangeable with other Video Adventures. Can be saved on tape. Requires 16K TRS80 I, III, 4, 4P

TRS80 $19.95 ATR $19.95

BAG IT MAN The ultimate arcade game for TRS80 or MC10! This one has three screens full of BAGS OF VALUABLE LOOT & SUE, SMEETE and TWO NASTY GUARDS. Great sound and action and continuous play. Requires 16K TRS80 I, III, 4, 4P

TRS80 $19.95 ATR $19.95

QUEST A different kind of adventure game. Your quest is to find the Holy Grail. Along the way you'll have to deal with evil knights, dragons, wizards, and quicksand. Requires 16K TRS80 I, III, 4, 4P

TRS80 $19.95 ATR $19.95

CRISTY '84's Fast action animation featuring Cristy (you) the person who is trying to get home from a very VERY interesting Atlantic Ocean island. There is not much time because as the result of a call above all hell breaks out of action, sound and fun.

TRS80 $19.95 ATR $19.95

MARS Your ship crashed on the Martian surface. In order to get home you will have to explore a Martian City. Retain your wits and fight with possibly hostile inhabitants. Graphics are not recommended as this Video Adventure is all in your imagination. Requires 16K TRS80 I, III, 4, 4P

TRS80 $19.95 ATR $19.95

PYRAMID ONE OF THE TOUGHEST ADVENTURES. Average time through the pyramid is 50 hours. Lots of rooms, traps, treasures, and some ingenious problems make this one of the most challenging VIDEO ADVENTURES.

TRS80 $19.95 ATR $19.95

CIRCLE 206 ON READER SERVICE CARD

NEW! GRAPHIC ADVENTURES

AARDVARK offers a unique line of graphic adventures. Action packed, fast moving, with beautiful graphics and sound. Each one is a complete story for a personal review and evaluation.

Adventure 1: **AARDVARK** Early 1920. Start for high quality, fast moving, graphic adventure. Requires 16K TRS80 I, III, 4, 4P

TRS80 $19.95 ATR $19.95

10 DAYS FREE Send amount indicated plus $2.00 shipping per order. Include quantity desired and your preference of tape or disk. Be sure to indicate type of system and amount of memory. When using charge card to order by mail be sure to include expiration date.

CHARGE CARDS WELCOME VISA

1-313-669-3110

PHONE ORDERS ACCEPTED 8:00 a.m. to 5:00 p.m. E.S.T. MON-FRI

AARDVARK *Action Software* 2362 B COMMERCE • WALLED LAKE, MI 48088 • (313) 669-3110

CM064 | TRS80C | IBMPC | VIC20 | TI99

TRS-80

LOOP=1 to 3 gives three flashes to each star before going on to pick another random star from the many on the screen. Maximum number of stars is 60, due to size of arrays. Line 34: position in array. Line 36: number of stars; max 60. Line 38: twinkle test. Line 90: Subroutine—set to twinkle, and reset array pointer."

Lines 50-56 set pixels at random locations on the screen in random colors. Lines 60-65 count the number of pixels; if there are fewer than 20 (or whatever number line 36 is set to), line 70 jumps the program to line 80, which jumps back to line 40, to keep on setting pixels.

If the pixel count goes over 20, line 65 calls the subroutine in lines 90-92, which resets the pixel counter to one, and sets TT to one. Now lines 71-79 come into play, to turn off—and right back on—each of the 20 pixels, three times each, in rotation as determined by their locations in the arrays. Also, a random melody is created by lines 73 and 75.

After the third off/on go-around (60 twinkles' worth, or three loops times 20, or LOOP*TW), the program jumps back to line 40, to turn off a pixel for keeps. A new pixel is turned on (to provide a little variety), and the sequence repeats.

In other words, after the program has reached line 79, a pixel is turned off permanently, and a new one is set by line 56 every three twinkles. To prove this, add:

```
58 PRINT @ 0, X;Y;Z
```

and watch the three numbers change rapidly at first until 20 pixels are set, then change only after each round of three twinkles.

The program can be adapted for a TRS-80 Model I/III/4 by dropping the Z or AZ part from lines 32, 56, and 76; dropping lines 54, 73, and 75; changing the 62 in line 50 to 127; and the 30 in line 52 to 47. The "twinkle" will be faster than on the CoCo; these stars don't actually turn completely off, as they do in color.

The TRS-80 Model 4 has the same SOUND statement as the CoCo, so you can leave in lines 73 and 75 if you have a 4. ■

Firms Mentioned in this Column:

Computerware
4403 Manchester Ave., Suite 102
Encinitas, CA 92024
(619) 436-3512

Kodak Instagraphic CRT Imaging Outfit
Box 82627
St. Paul, MN 55182
(716) 458-1000

How long is an idea?

With Revelation® by Cosmos, it won't matter. Our variable length structure lets you think long or short without worrying about needing disk space you don't have, or squandering space you can't afford. Think of it. Relational Data Base Management Software that saves up to 40% of your PC's disk space.

As a powerful, enhanced version of the PICK™ Operating System, Revelation uses plain English to create files, menus, entry screens, process information and generate reports. Plus, you can build, customize and update your data base application without being an experienced programmer.

When you introduce your IBM® PC or compatible to Revelation, you'll see it change into a friendly brute that can communicate with other computers. Also featured is a hybrid full-structured programming language with an interactive debugging tool for serious development work.

Besides bringing the power, speed and flexibility of a minicomputer to your PC, Revelation works with MS/DOS™ so you can use all the popular microcomputer software packages with the applications you develop.

Indeed, Revelation is easy to get along with. A veritable gentle giant. But, you need to know more before you decide to buy what may become your most valuable business tool. So call us at (206) 824-9942 and let us arrange for you to see what we've got here.

MS/DOS™ of Microsoft Corp. IBM PC, Registered T.M. of International Business Machines Corp. PICK Operating System™ of PICK SYSTEMS.

Cosmos Inc. 19530 Pacific Highway S.

COSMOS™

Seattle, WA 98188, (206) 824-9942

CIRCLE 118 ON READER SERVICE CARD

Lyco Computer Marketing & Consultants

TO ORDER CALL US

TOLL FREE 800-233-8760

In PA 1-717-327-1824

KOALA

KOALA TABLET	$84.75
PROGRAMMERS GUIDE	$12.75
GEOMETRIC DESIGNS	$22.75
LOGO DESIGN	$27.75
ILLUSTRATOR	$99.75
SONG WRITER D	$27.75
MASTER TYPE	$27.75

CONTINENTAL

HOME ACCOUNT D	$44.75
TAX ADVANTAGE	$35.75
BOOK OF APPLE SOFTWARE	$18.95
GENERAL LEDGER	$179.95
ACCOUNTS PAY.	$179.95
ACCOUNTS REC	$179.95
PAYROLL	$179.95
PROPERTY MGMT	$329.95

BRODERBUND

BANK STREET D	$44.75
CHOPLIFTER D	$24.95
DAVID'D MAGIC	$24.95
DROL D	$24.95
LODE RUN D	$24.95
SEAFOX D	$22.95
SPARE CHANGE D	$24.95
AE D.	$24.75

SSI

KNIGHTS OF DESERT	$26.75
EAGLES	$26.75
TIGERS IN SNOW	$26.75
GERMANY 1985	$36.75
BATTLE FOR NORMANDY	$28.75
SHATTERED ALLIANCE	$30.75

AMDEK

VIDEO 300	$139.00
VIDEO 300A	$149.00
COLOR 1+	$269.00
COLOR 11+	$399.00

GORILLA

12" GREEN	$82.00
12" AMBER	$89.00

NEC

JB1260 GREEN	$99.00
JB1201 GREEN	$145.00
JB1205 AMBER	$145.00
JC1215 COLOR	$269.00
JC1216	$399.00

SAKATA

SC100 COLOR.	$229.00
SG1000 GREEN	$99.00
SA AMBER	$109.00

TIMEWORKS

INVENTORY	$36.75
ACCOUNTS REC.	$39.75
ACCOUNTS PAY	$39.75
GENERAL LEDGER	$39.75
PAYROLL	$39.75
INVENTORY MAN	$36.75
CASH FLOW	$36.75
SALES ANALYSIS	$36.75
DATA MANAGER	$18.75
MONEY MGR C/D.	$19.95
CHECKBOOK C/D	$18.95
FORGET ME NOT	$19.95
STAR BATTLE	$19.95
ROBOT REVOLT	$19.95
SPELLBOUND C/D	$19.95

KOALA 64

KOALA TABLET	$69.75
PROGRAMMERS GUIDE	$12.75
GEOMETRIC DESIGNS	$22.75
LOGO DESIGN	$27.75
SPIDER EATER	$22.75

CARDCO

LIGHT PEN	$29.75
5 Slot Expension 64	$54.00
64 Write NOW	$39.00
64 Mail NOW	$29.00
2.) Write NOW	$29.00
64 Keypad	$29.00
Universal Cass. Int.	$29.75
Printer Utility	$18.75
5 Slot Expension	$75.95
3 Slot Expension	$24.95

SPINNAKER 64

KINDERCOMP D/R	$21.75
STORY MACH ROM	$24.75
FACE MAKER D/R	$24.75
SNOOPER TR D	$26.75
SNOOPER T2 D	$26.75
DELTA DRAW ROM	$26.75
FRACTION F ROM	$24.75
KIDS ON KEYS	$24.75

COMMODORE

MITEY MO. 79.95

MODEMS

HES 64

TURTLE TUTOR	$22.75
TURTLE TRAINER	$22.75
TURTLE GRAPHICS	$22.75
SOUND BOX	$9.95
64 FORTH	$39.95
HESMON	$22.75
GRIDRUNNER	$19.75
ATTACK OF MC	$22.75
HESWRITER	$26.75
OMNI WRITER	$45.75
TYPE N WRITER	$24.75
PAINT BRUSH	$22.75
BENJI	$25.75
HOME MANAGER	$28.75
TIME MONEY MGR	$44.75
OMNI CALC	$33.75
SWORD POINT	$19.95
HES MODEM	$49.95
M. MULTIPLAN	$65.75

SPINNAKER

STORY MACHINE R.	$26.75
FACE MAKER R	$24.75
KINDERCOMP R	$20.75
FRACTION FEVER R	$24.75
DELTA DRAWING R	$26.75

ATARI

DEADLINE	$34.75
ENCHANTER	$34.75
INFIDEL	$34.75
PLANETFALL	$34.75
STAR CROSS	$34.75
SUSPENDED	$34.75
WITNESS	$34.75
ZORK I	$34.75
ZORK II	$34.75
ZORK III	$34.75

BUSINESS

VISICALC	$159.75
LETTER PERFECT	$89.75
LETTER PERFECT R	$89.75
DATA PERFECT	$89.75
FILE MANAGER	$69.75
HOME FILE MGR	$69.75
BOOKKEEPER	$19.75
C.R.I.S.	$119.75
TEXT WIZZARD	$34.75
SPELL WIZZARD	$34.75

PARKER BROTHERS

TUTANKHAM R.	$33.75
SUPER COBRA R	$33.75
ASTRO CHASE R.	$33.75
FROGGER R	$33.75
Q BERT R.	$33.75
POPEYE R	$33.75

MONITORS

TAXAN

100 GREEN	$115.00
105 AMBER	$125.00
210 RGB COMPOSITE	$269.00
400 RGB MEDRES	$295.00
410 RGB HI RES	$349.00
420 RGB HI RES (IBM)	$475.00
121 GREEN	$145.00
122 AMBER	$149.00

ZENITH

ZVM 122A AMBER	$95.00
ZVM 123G GREEN	$85.00
ZUM 124IBM-PC	$129.00
ZUM COLOR	$279.00
ZUM 133 RGB	$389.00
ZUM 135 RGB	$449.00
ZUM 136	$589.00

ATARI

INFOCOM

DEADLINE	$34.75
ZORK 1,2, or 3	$26.75
ENCHANTER	$34.75

EDUFUN

GULP ARROW GRAPHICS	$24.75
FACE FLASH	$24.75

CONTINENTAL

HOME ACCOUNT D	$44.75
TAX ADVANTAGE	$35.75
BOOK OF ATARI SOFTWARE	$18.95

SCARBOROUGH

SONG WRITER D	$27.75
MASTER TYPE	$27.75

EASTERN HOUSE

MONKEY WRENCH II	$52.75

DON'T ASK SOFTWARE

SAM	$39.75
ABUSE	$22.75
WORD RACE	$24.75

PROGRAM DESIGN

ANALOGIES	$14.50
PREP FOR SAT'S	$79.75
PRESCHOOL IQ BUILDER	$16.75
READING COMP	$16.75
VOCABULARY BUILDER	$16.75
LET'S SPELL	$14.75

AMERICA'S MAIL ORDER HEADQUARTERS

LYCO COMPUTER

WORLD'S LEADER IN SALES & SERVICE

LYCO COMPUTER
P.O. BOX 5088
JERSEY SHORE, PA 17740
(717) 327-1091
CATALOG AVAILABLE

Lyco Computer Marketing & Consultants

TO ORDER
CALL US

TOLL FREE 800-233-8760
In PA 1 717-327-1824

SAVE ON THESE IN STOCK PRINTERS

MANNESMANN TALLY

SPIRIT 80	$299.00
MT-160L	$559.00
MT-180L	$775.00

NEC

NEC8023	$369.00
NEC8025	$699.00

PRINTER INTERFACING

AVAILABLE FOR COMMODORE VIC APPLE ATARI IBM PC TRS 80, TI, AND OTHERS

Apeface	$9.95
Tymac Connection	CALL
Axiom	CALL
Microbits 1150	CALL

CARDCO

LQ1	$449.00
LQ2	$279.00
LQ3	$339.00
PRINTER INTERFACE	$39.75
PRINTER INTERFACE WITH FULL GRAPHICS	$65.75

STAR MICRONICS

GEMINI 15X	$379.00
DELTA 10	$449.00
DELTA 15	$525.00
RADIX 10	$575.00
RADIX 15	$675.00
POWERTYPE	$CALL
SWEET P (Model 100)	$549.00
STA80	$149.00

GEMINI 10X $259.00

CITOH

GORILLA GX-100	$119.00
GORILLA SERIAL	$129.00
PROWRITER 8510	$335.00
PROWRITER II	$575.00
8600	$699.00
STARWRITER	$929.00
PRINTMASTER	$1199.00
SHEET FEEDER	$425.00
620	$929.00
630	$1699.00
8510 SP	$499.00
8510 SCP	$559.00
A10 LETTER QUAL	$499.00

EPSON

RX-80	$289.00
RX-80FT	$299.00
FX-80	$439.00
FX-100	$639.00

OKIDATA

80	$199.00
82A	$299.00
83A	$569.00
84	$959.00
92	$409.00

LEGEND

880	$259.00
1000	$279.00
1200	CALL
1500	CALL
1018	CALL

PANASONIC

1090	$279.00
1091	$309.00
1092	$459.00

ATARI

1050 DRIVE	$299.00
1027 PRINTER	CALL
1025 PRINTER	$299.00
1020 PRINTER	$219.00
1010 RECORDER	$74.00

BLUE CHIP

M120 10	$279.00
M120 10 C-64	$279.00
D4015	$1398.00

PRINTING PAPER

3000 SHEETS FANFOLD	$42.75
1000 SHEETS FANFOLD	$19.75
1000 SHEETS LETTER	$21.95
200 SHEETS LETTER	$6.99
150 RAG STATIONERY	$10.99
MAILING LABELS (1 in)	$9.75
14x11 1000 FANFOLD	$24.75

HARD DISK DRIVES
-FOR-
IBM, APPLE, TRS80

10 MEG	$975.00
20 MEG	$1399.00
30 MEG	CALL

* DOS EXTRA

INNOVATIVE CONCEPTS

DISK STORAGE (10)	$4.95
DISK STORAGE (15)	$9.95
DISK STORAGE (25)	$19.95
Disk Storage (50) w/Lock	25.75
Disk Storage (50)	17.95
ROM STORAGE (10)	$24.75

COMPUTER CARE BIB

DISK DRIVE CLEANER	$12.75
COMPUTER CARE KIT	$19.75

NORTRONICS

DISK DRIVE CLEANER WITH SOFTWARE FOR IBM PC, ATARI, VIC, APPLE, & TI	$29.75
DISK CLEANER REFILLS	$14.75
CASS DRIVE CLEANER	$9.95
MEDIA BULK ERASER	$46.75

DISKETTES

SKC

SKC-SSSD	14.75
SKC-SSDD	17.75
SKC-DSDD	21.75

ELEPHANT

5¼" SSSD	$16.75
5¼" SSDD	$19.95
5¼" DSDD	$25.95

MAXELL

5¼" MD-1	$24.75
5¼" MD-2	$34.75

MODEMS

ANCHOR MARK I	$45.75
ANCHOR MARK II	$45.95
HAYES SMART	$239.00
HAYES MICRO II	$309.00
MICROBIT 1000C	$129.00
CAT	$144.00
D-CAT	$155.00
J-CAT	$115.00
APPLE CAT II	$279.00
212 APPLE CAT	$589.00

OVER 2000 SOFT-WARE TITLES IN STOCK

STOCKING PRINTER INTERFACE AVAILABLE FOR MOST COMPUTERS

PERCOM

AT88S1	$249.00
AT88S1 PD	$299.00
ADD-ON DRIVES	CALL
AT 88 DOUBLER	$119.00

DISK DRIVES

RANA 1000 ....$299
INDUS GT.....$325

CONCORD

ATARI 176K MASTER	$269.00
ATARI 346K MASTER	$369.00
ATARI ADD-ON DRIVES	$CALL

INNOVATIVE CONCEPTS

FLIP-N-FILE 10	$3.75
FLIP-N-FILE 15	$8.95
FLIP-N-FILE 25	$18.95
FLIP-N-FILE 50	$17.75
FLIP-N-FILE (Rom Holder)	$17.75

TRACK DRIVES

AT-D2	$329.00
AT-D2 TURBO PAK	$22.95
AT-DH	CALL
PRINTER CABLE	$22.95

CUSTOMER SERVICE
1-717-327-1825

TO ORDER
CALL TOLL FREE
800-233-8760
or send order to
Lyco Computer
P.O. Box 5088
Jersey Shore, PA 17740

POLICY

Risk Free -

No deposit on C.O.D. orders; free shipping on prepaid cash orders within the continental U.S.

APO, FPO, and international orders add $5.00 plus 3% for priority mail service. PA residents add sales tax. Advertized prices show 4% discount offered for cash; add 4% for Master Card or Visa.

CIRCLE 159 ON READER SERVICE CARD

New products from Teleram, Gavilan, Sharp and Portable Computer Support Group

Notebook Computing

David H. Ahl

This month in our Notebook Computing column we take a look at several new computers, some new peripherals, software and books, as well as the fate of some previous entries in the field.

Teleram and Dulmont: A New Team

Teleram, makers of the T3000 (see *Creative Computing*, Jan. 1984) has introduced three new family members, the T3500, T4000, and T5000. The T3500 is billed as an office workstation. It consists of an expansion chassis, 12" video monitor, and up to four floppy disk drives and can be used with any of the Teleram portable computers. The CRT displays 24 lines of 80 characters.

The main difference between the three computers is the size of the display. All have 80 characters with the T3000 having four lines; the T4000, eight lines; and the T5000, 16 lines. All three machines have 64K of dynamic RAM, 128K of bubble memory (expandable to 256K), RS-232 port, acoustic coupler, and AC charger. They run CP/M and include word processing and communications software.

In addition, Teleram has become the U.S. distributor for the Australian-made Dulmont Magnum notebook portable computer. The Magnum is available with either an 8- or 16-line LCD screen. It is based on the 16-bit 80186 mpu and has 128K of RAM (expandable to 256K), dual (external) 3½" floppy disks (720K capacity), one parallel and two serial ports, a real-time clock, and a 74-key full-stroke keyboard. It runs MS-DOS and includes ROM-based word processing, spreadsheet, and planning/diary software as well as Basic.

Gavilan—Revisited

Although the Gavilan was announced in June of 1983 at NCC, quantity deliveries did not begin until June 1984. We were told there were some bugs to be worked out, some of which resulted in basic changes to the product itself. The computer is based on a 16-bit mpu, the 8088. The basic Gavilan has 96K and a 16-line, 80-character display.

The SC model has 64K and an 8-line display. Memory is expandable to 160K internally and 288K with a clip-on module. The machine has a double-sided 3½" floppy disk drive with quad density for a total formatted capacity of 360K. In addition to a standard keyboard, the machine has a touch panel above the keyboard, which Gavilan refers to as a "solid state mouse."

The machine measures 11.4" x 11.4" x 2.7" and weighs 9 lbs. The internal NiCad battery pack is good for eight hours of use and can be recharged to 80% of capacity in just one hour.

A snap-on thermal printer adds 4.9" to the depth and weighs five pounds. It can print characters or graphics on either thermal or plain paper.

The operating system is MS-DOS and currently-available software includes *WordStar, SuperCalc 2, Acculink, PFS:File, PFS:Report*, Basic, Pascal, C, and Macro, with many additional packages promised by the end of 1984.

Price of the Gavilan is $3995; the SC model is $2995; and the printer $985, with software packages ranging from $125 to $300.

Departures From the Ranks

As we were putting together our annual computer *Buyer's Guide*, we were struck by the number of manufacturers of notebook portables that we had in our roundup in January that are no longer on the scene. Toshiba withdrew the T100 from the U.S. market and two other Japanese manufacturers, Canon and Casio, never really promoted their machines here in a major way.

Xerox dropped the 1800 (a machine made by Sunrise) altogether, while Convergent Technologies suspended production of the Workslate until current inventories are cleared. MicroOffice, looking for OEMs for their Road Runner, appears to be looking still, and, judging from the announced peripherals for the CC-40 that are not yet available, TI may be having some second thoughts about that unit.

That means that in less than nine months, five to seven systems have bitten the dust. On the other hand, in the same time period, at least eight new systems have been announced. Hence, from the consumer point of view, you have more choice than ever before. Nevertheless, it is probably more important than ever to make a wise choice given the rapidly changing fortunes in this volatile market.

Micro Floppy Drive and New Software for PC-5000

Sharp has introduced a battery-powered 3½" micro floppy disk drive for the PC-5000 portable computer. The drive uses the standard Sony disk and records double density (40 tracks) on both sides for a total formatted capacity of 360K.

PC's $2995 COMPAQ SWEEPSTAKES

You can win a COMPAQ IBM Compatible Portable Microcomputer System by entering *PC*'s SWEEPSTAKES! No purchase is necessary, just mail in the completed Entry Form today! One lucky reader will win the COMPAQ PORTABLE, offering the full functions of an IBM PC with the portability of an electric typewriter!

You're sure to win with *PC!*

Check the YES box as you enter and broaden your PC knowledge by subscribing to *PC*, The Independent Guide To IBM Personal Computers! Your subscription to *PC* will give you 26 big issues a year, full of new ideas, program concepts, hardware and software reviews and the latest-breaking news and events *for less than $1.10 a copy!*

USE THE ATTACHED CARD TO ENTER *PC*'s SWEEPSTAKES AND TO BEGIN YOUR SUBSCRIPTION TO *PC*!

PC's $2995 COMPAQ SWEEPSTAKES

OFFICIAL ENTRY FORM

☐ **YES!** Enter my name in the *PC*'s SWEEPSTAKES and start my subscription to *PC* for.
- ☐ 20 issues for $21.97. Save 18%
- ☐ 40 issues $39.97. Save 26%

☐ NO, I don't wish to subscribe now, but tell me if I've won the *PC*'s SWEEPSTAKES.

Mr./Mrs./Ms. _____

PC 8H351

Company _____

Address _____

City _____ State _____ Zip _____

Check one: ☐ Payment enclosed ☐ Bill me later

Charge my: ☐ American Express ☐ Visa ☐ MasterCard

Card No. _____ Exp. Date _____

Offer valid in U.S. only

Please allow 30 to 60 days for delivery of first issue

NO PURCHASE REQUIRED! ENTER TODAY!

PC's $2995 COMPAQ SWEEPSTAKES

Win a COMPAQ Portable Microcomputer system by entering PC's SWEEPSTAKES!

You have the opportunity to win a fully portable IBM compatible system weighing less than 28 lbs...giving you:

- Full function keyboard!
- Systems box housing the CPU Chassis, 9" phosphor screen and one 320K 5.25" double-sided disk drive!
- An MS-DOS 1.1 IBM PC Compatible system...featuring 16 bit 8088 CPU, 128K RAM expandable to 512K, Microsoft Basic included. RGB output along with NTSC. Parallel port and 3 expansion ports!
- The COMPAQ Portable will run on over 95% of the software written for the IBM PC!

ENTER TODAY! NO PURCHASE NECESSARY!

BE A WINNER ALL YEAR LONG ..SUBSCRIBE TO *PC*, The Independent Guide to IBM Personal Computers today and pay *less than $1.10* a copy!

ENTER *PC*'s SWEEPSTAKES AND YOU MAY WIN A $2,995 IBM COMPATIBLE PORTABLE MICROCOMPUTER!

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 66 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC's SWEEPSTAKES
P.O. Box 2442
Boulder, Colorado 80321

OFFICIAL RULES:

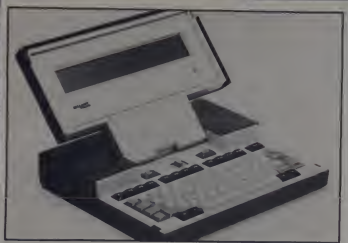
No Purchase Necessary

1. On an Official Entry Form or a 3" x 5" piece of paper, hand-print your name, address and zip code. Enter as often as you wish, but mail each entry separately to *PC*'s SWEEPSTAKES, P.O. Box 2442, Boulder, Colorado 80322. Entries must be received no later than January 2, 1985 and the drawing will be held January 31, 1985. All entries become the property of *PC* Magazine, which reserves the right to reprint the name and address of the winner.

2. The winner will be selected in a random drawing from among all entries received, under the supervision of the publishers of *PC*, whose decision will be final. Only one prize will be awarded in this Sweepstakes. Winner will be notified by mail and may be required to execute affidavit of eligibility and release. Odds of winning will depend on the number of entries received. Ziff-Davis will arrange delivery of prize. Taxes are the responsibility of the winner. Any manufacturer's claims and warranties will apply, but Ziff-Davis makes no claims or warranties with regard to any prizes. Prize is not transferable. No substitutions for prizes.

3. Sweepstakes open to all residents of the U.S., its territories and possessions, except employees (and their families) of Ziff-Davis Publishing Company, its affiliates, and its advertising and promotion agencies. Void wherever prohibited or restricted by law.

4. For the winner's name, send a stamped, self-addressed envelope to *PC*'s SWEEPSTAKES, Circulation Department, One Park Avenue, New York, NY 10016.



The Dulmont Magnum notebook portable computer.

The Gavilan mobile computer features a built-in 3½" disk drive.

The unit measures 5.5" x 9.2" x 2.6" and weighs 6.6 lbs. It can be powered by either a rechargeable lead battery (6V) or an AC adaptor. The design is said to minimize battery drain when the drive is not in use. The PC-5000 can interface with one or two disk drives (micro, mini, or one of each).

Sharp also introduced a 256K memory expansion cartridge for the PC-5000. The cartridge plugs into Slot 1 on the bottom of the computer and expands the internal 64K to 320K.

A software package designed by Diversified Computer Systems of Boulder, CO and sold by Sharp, converts the PC-5000 into a DEC VT102 terminal for use with DEC or other mini or mainframe computers.

Sharp is in the process of testing a prototype Unix system on the PC-5000. According to Frank Barbosa of Sharp's System Division, "If test marketing shows an interest, we would proceed next to an EPROM system for added speed and testing toward development of a ROM-based system."

New Packages from PCSG

We have reviewed several packages from the Portable Computer Support Group for the Model 100 and have been generally impressed with their quality. While we have not seen these new packages, they sound interesting.

Type+ transforms the Model 100 into an electronic memory typewriter. You see the last line on the screen as it appears on paper, as a virtual window. You can set the screen view area from an entire line to a single word to immediate print as you desire.

Type+ provides word processing features such as tab, automatic centering, set margins, underline, and boldface. You can also store names and addresses, phrases, or paragraphs, and recall them with a single function key. Price is $69.95.

Tutor+ is a program to teach touch typing and consists of 30 lessons which present exercises at graded speed. A nice feature of the program is the ability to set your own typing speed and learning pace. It also has a game option which challenges you to save the earth from destruction by typing faster and more accurately. Price is $49.95.

Disk+ is a program which allows you to use the disk storage on your Apple,

PCSG Disk + transfers files between a Model 100 and desktop system.

IBM PC, TRS-80, or CP/M-compatible computer to store and retrieve disk files with a single function key. The program utilizes the RS-232 port with a null modem cable. Price is $69.95.

Tenkey+ is a program for business analysis. It performs strategic business "what if?" calculations, calculates amortization schedules, solves for any of 12 variables in financial formulae, and generates breakeven analyses, NPV, compound interest, and many other common business calculations. Price is $59.95.

PCSG has a free 14-page catalog which describes these products and several others in detail.

New Books

Several excellent new books about the Model 100 (and NEC 8201) have recently appeared. The Simon & Schuster *Guide to The TRS-80 Model 100* by Danny Goodman has ten chapters divided into three main parts. The first part has a general introduction to notebook machines followed by a comprehensive comparison of the Model 100 and NEC 8201. The two chapters in Part II cover the nuts and bolts of the hardware and interfacing to the outside world (one of the shallower chapters of the book). Part III, Using Model 100 Software, makes up the last six chapters.

Many authors of books about the Model 100 seem to assume their readers have not read the manual and simply repeat the contents in different words. Fortunately, Danny doesn't slip into this trap and, in most cases, takes the reader one or two steps beyond the manual. On the other hand, some sections stop short of being truly useful. For example, Danny whets your appetite for transferring text files from the Model 100 to another computer and discusses the pitfalls, but doesn't really tell how to do it.

Nevertheless, in the 216 pages, you'll probably find several things that will justify the $9.95 expenditure. ■

Manufacturers Mentioned in this Column:

Teleram Communications Corp.
2 Corporate Park Dr.
White Plains, NJ 10604
(914) 694-9270

Gavilan Computer Corp.
P.O. Box 5004
Campbell, CA 95008
(408) 379-8000

Sharp Electronics Corp.
10 Sharp Plaza
Paramus, NJ 07652
(201) 265-5600

Portable Computer Support Group
11035 Harry Hines Blvd.
Dallas, TX 75229
(214) 351-0564

Apple Cart

John J. Anderson and Owen Linzmayer

This month young Mr. Linzmayer and I will divide the honors of hosting the Apple Cart. I will bring you up to date on some Macintosh news, and then Owen will look at an exciting number of new products for the II+ and IIe.

While I have long used an Apple II+ as a word processor and to run graphics and game programs, I have never been an "Apple to the core" person. Rather I have remained an objective admirer. The last time I wrote an Apple Cart (July 1983), I reported on Apple's User Group Conference for IAC brass, where the IIe was introduced. I was impressed. I called the conference "a gracious and thoughtful christening for the new machine." But I saw the IIe as II with lower case, an improved keyboard, and a really low chip count. It was no Apple IV.

What really impressed me at the time was the Lisa. It had some incredible capabilities, though it took about $10,000 to make them your own. I wondered if that technology would or could ever appear in a relatively inexpensive machine.

Mac: I'm A Believer

Well it took another year, but finally the Macintosh appeared. And I was swiftly converted from an ardent admirer to a true believer. In the time since my review of the Macintosh computer (July 1984), I have grown to know and love the machine. Sure, I'm still waiting for a writer's word processor, with virtual memory storage and things like word counts and print spoolers, but quality Mac software has begun to appear, along with peripheral upgrades that give it formidable powers.

Second Microfloppy Drive

The Mac is ahead of the schedule I had set for it in my review. Second drives, for example, have now begun shipping in quantity. I walked into my local computer store a few weeks ago and simply walked out with one (I had to pay for it, of course). What a difference it has made in file handling!

Now data files can reside on one disk, while all program and utility files reside on a system master. Tiresome disk swaps are eliminated completely, and psychologically there is a lot more space to stretch out in. Though $495 seems a little steep for a unit that OEMs for so much less, it is well worth it in time saved and annoyance avoided.

Tecmar Mac Drive

Of course there is another peripheral that can even beat out a second floppy drive for convenience—a hard disk. I have had a Tecmar Mac Drive hooked up for the last few days, and it proves that a hard disk drive is a natural for the Macintosh. With a 5 meg cartridge online, there is more than enough breathing room. And working with the hard disk is just like working with any other disk—it appears as a Mac Drive icon on your desktop.

For my purposes, I would have been happier with the 10 meg fixed disk model, but that is a matter of taste. A removable cartridge increases convenience, security, and versatility. On the other hand, the user is "constrained" to 5 meg hard disk access. I would much rather trade disk space for cartridge portability.

Not everything about the Tecmar drive is ideal, but very few of the disadvantages are the fault of Tecmar. Rather, it is the Macintosh itself and protected software that make the Mac Drive less terrific than it could be.

Because of the internal architecture of the Mac, you can't boot directly from hard disk. That means that you must always begin with a system floppy in the Mac's internal drive. Once the custom System Folder is installed, you can remove the system floppy and insert a data disk. But every session must begin with a boot from the internal drive.

Then there is the question of protected software—a question that has haunted hard disk owners since well before the Macintosh came on the scene. If a piece of software is protected, it cannot be transferred to hard disk, so it must be run from a floppy drive. In many if not most cases, the program floppy must remain in the drive during use as well.

The result of this is that many important applications, including database and spreadsheet programs, are not compatible with a hard disk drive. Oh woe. If only those applications were copyable.

When the Mac first appeared, word had it that most applications, like MacPaint and MacWrite, would be unprotected. Consumers rejoiced. How considerate, enlightened, and generous of Macintosh programmers, to realize the need to copy programs for personal use. All your heavy duty applications would be able to reside entirely on hard disk. You wouldn't need an entire library of applications disks at hand at all times.

Then the debugged version of *Multiplan* showed up, and it was protected. Don't waste time trying to copy it to hard disk. You'll get the icon to transfer, all right. But you'll be asked to insert the system master disk upon execution of the icon. Soon other packages started to come in,

Best Connection

ProModem™ 1200A Apple Card Pack

It's the best 300/1200 baud 212A telephone modem for your Apple® II, II+, and IIe. "Best" because it's the easiest to install and use, provides more useful modem features for your money, and lets you add software capabilities as your needs grow.

We really do mean easy. Just plug the ProModem Card Pack into any expansion slot and connect the telephone cord. On-board intelligent software in ROM includes a simple but powerful terminal program. With a few keystrokes, you'll be "on line" and communicating.

ProModem 1200A offers you the best price-to-performance modem available with Auto-Answer and Auto-Dial, Programmable Intelligent Dialing, Built-in Speaker with Volume Control, Help Commands, Extensive Diagnostics, and more.

And when you need more sophisticated capabilities like Terminal Emulation, you're all set.

The 1200A is fully Hayes compatible. You'll be able to use most of the Apple II communications programs available.

PRICE COMPARISON

PROMETHEUS

(1) ProModem 1200A Apple Card Pack, complete with on-board software and all necessary hardware
List Price: $449

HAYES

(1) Smartmodem 1200 "standalone modem"
(2) Serial Card
(3) RS-232C Cable
(4) Communications Software
Total List Price: $957

Apple® is a registered trademark of Apple Computer, Inc.

The "Help" Screen and "Auto redial if busy" functions make the 1200A convenient to use. The second phone jack for the telephone handset allows switching from voice to data. You get all of this, ready to use, complete with easy to understand documentation, and a telephone cord for only $449.

See your local dealer for a demonstration. He'll show why ProModem 1200A is your best connection.

Prometheus Products, Inc.
45277 Fremont Blvd.
Fremont, CA 94538
(415) 490-2370

PROMETHEUS®

CIRCLE 211 ON READER SERVICE CARD

each and every one protected against copying.

As it turns out, MacPaint and MacWrite are about the only two Macintosh packages that aren't protected. What about all those promises, folks?

Well, despite the drawbacks, a hard disk still has a place alongside the Mac. I tried hard to get things to screw up, but couldn't manage to do any real damage. It was fun trying to get the Mac to try to eject the hard disk—but it never caused any harm. Guess the people at Tecmar thought of that.

Answer the MacPhone

Another neat object that recently appeared at the lab is the MacPhone, a hardware/software system that combines a telephone with Macintosh software that will autodial, keep a personal "phone book," monitor charges, log all calls, even keep an updated calendar. You can type and print messages, print out phone book logs, and use the Mac's internal sound system to dial numbers right out of your directory.

The MacPhone bills itself as "a unique concept in telecommunications," a statement that sent me excitedly looking through the box for a modem cable. Such is not the case. If your definition of telecommunications is talking on the phone, you will have greater enthusiasm for the MacPhone than I did. If, in fact, the product did come with a built-in modem and telecommunications software, it would be a sure winner—combining voice and telecommunications into one integral system. Perhaps this is on the way from maker Intermatrix.

Mac on MAUG

While we're on the topic of telecommunications, I'd like to take the opportunity to thank Dennis Brothers of MAUG (PCS-51), the Apple user's group on CompuServe on behalf of Macintosh owners everywhere. Dennis offered the first full-featured tele-communications program for the Mac, written in Microsoft Basic. It has gone through many revisions and in recent incarnations allows not only text uploads and downloads, but automatic formatting of text into MacWrite format and transmission as well as decoding of binary MacPaint files.

Dennis did something so "unusual" with his terminal program that even *Time* magazine took notice. He posted it in a MAUG database on CompuServe so that anybody could download it. Sure, the connect time will cost you, but that's it. He didn't even invite "donations."

Thanks, Dennis, for a wonderful program, and an exemplary attitude. You helped get *Creative Computing's* Macintosh online and communicating with its own special interest group (PCS-22). And thanks for fielding all my dumb questions along the way.

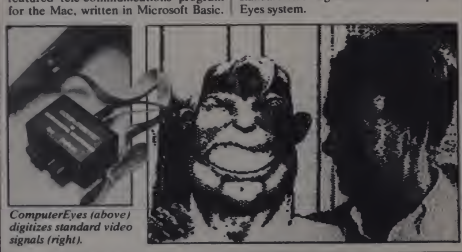
Well I could go on and on, but Owen wants to look at some hardware and software for the Apple II series, so I'd better wrap up. Take it away, Owen!

ComputerEyes

You can often evaluate a new product simply by noting the decline in general productivity of our editorial staff. When we get something really exciting for review, a crowd usually gathers to see what's up. The longer a new product can hold the attention of the onlookers, the higher the marks the product gets on our preliminary rating scale.

It did not take long for a group to gather 'round the old II+ this morning after I set up the Digital Vision ComputerEyes video acquisition system. With ComputerEyes installed, the Apple can read any standard video signal, as from a video tape recorder, and convert the picture to a black and white digitized computer display.

ComputerEyes is a small (4" x 4" x 1.75") black box that connects to the Apple 16-pin game I/O socket. The RCA phone jack on the back of the box is where the standard video signals enter the ComputerEyes system.



ComputerEyes (above) digitizes standard video signals (right).

Any video device that outputs NTSC video or standard non-interlaced industrial video may be used with ComputerEyes. This includes video tape recorders (Beta and VHS), disc players, and those nifty portable cameras. For our review, we used an Olympus VHS tape deck with accompanying hand-held camera.

Supplied with the ComputerEyes hardware is a single disk which contains the acquisition program, *Executive*. This software allows you to adjust the sync of the video source and computer, capture normal and gray-scale images, and save/load these images to/from disk. Operation of ComputerEyes is as simple as point and shoot. Once you have the image from the video source that you want to capture, all you do is press the N key to get a normal high-contrast image. If you use the gray-scale option, eight different images are taken and superimposed upon one another.

Without writing your own applications, all you can do with *Executive* is view the digitized images on the computer screen. Digital Vision President, David Pratt, explains that they "wanted to draw the line between providing the acquisition and the application software" because the possible uses for ComputerEyes are infinite.

"Many applications are obvious. Others are bound to surface, once the product is in the hands of the creative members of the personal computer community" says Mr. Pratt.

ComputerEyes comes with excellent documentation. The 27-page instruction manual covers everything from set-up to theory of operation. ComputerEyes sells for $350 with a black and white video camera, or $130 sans the camera.

Time-Trax

Is your desk cluttered with scraps of paper with important appointments and dates frantically scrawled on them? If so, Time-Trax may be for you. Manufactured by Creative Peripherals Unlimited (CPU), the $99.95 Time-Trax package consists of a time and date oriented calendar program and a clock module that plugs into the Apple internal 16-pin game I/O socket.

Installation of the Time-Trax clock module, a small 1" x 2" circuit board, is simple. The module is transparent to software that reads the joystick and paddle positions, but can be read by your own Basic and machine language programs. Complete directions for incorporating the clock functions into your code are given in the documentation.

Time-Trax is a menu-driven time management system. The software supplied can monitor several peoples' appointments, errands, holidays, tasks, etc. As the primary user, you can add/review entries, search for entries using a target word, and examine the calendar. The obvious question arises,

"can I justify $100 for a computerized appointment book?" That depends.

Time-Trax offers several features no conventional appointment book can match. Using a printer, it can provide you with a hard-copy to take with you wherever you go. Time-Trax can also be programmed to give you advance notice of an upcoming event. When you miss an event, Time-Trax brings it to your attention.

The clock module is inserted into the 16-pin game socket found on all 48K Apple II computers except the IIc. To initialize the Time-Trax module, you set the time, date, and year using the boot disk. Once set, you can "write-protect" the clock via a switch on the circuit board. The module gets its power from two AA alkaline batteries which mount inside the Apple case. CPU claims that the batteries can provide up to two years of uninterrupted power.

Voice Box III

The Voice Box III from The Alien Group of NYC is designed for use with Apple II and IIe computers and comes complete with a small controller card, demo disk, external 3.5" speaker, and documentation—all for $130 retail.

Installation of the unit is simple. The Voice Box III controller card slips into expansion slot 3, and the voice output can be routed to the internal Apple speaker, the supplied external speaker, or both. Using the voice driver programs on the demo disk, you can enter regular English text and have the computer speak exactly what is typed. These programs may be easily transferred to another disk for custom use.

Like all voice synthesizers we have tried over the years, the computer voice of the Voice Box III takes some getting used to. The Voice Box III utilizes the new SSI 263 speech chip which generates more natural speech than earlier phoneme synthesizers using the popular SC-01 or TMS 5200 chips. As is typical of most commercial voice synthesizers, some English words must be spelled differently so that the Voice Box III can pronounce them correctly.

The Voice Box III offers several interesting features not found on all voice generators. For instance, you can easily switch between male and female voices. Instant sex change! Also, the computer can be set to automatically add intonation to speech, or you can manually add intonation by inserting numbers into the text to be spoken.

Other options include pauses between words, the speed of voice, and the volume. If it is flexibility that you are looking for, Voice Box III offers it, but you must be prepared to spend a lot of time manually fixing the text to get the computer to speak in a perfectly comprehensible voice. ■

Firms Mentioned In This Column

The Alien Group
27 W. 23rd St.
New York, NY 10010
(212) 741-1770

Creative Peripherals Unlimited
22952 Alcalde, Suite 160
Laguna Hills, CA 92653
(800) 854-8021

Digital Vision, Inc.
14 Oak St., Suite 2
Needham, MA 02192
(617) 444-9040

Intermatrix
5547 Satsuma Ave.
North Hollywood, CA 91601
(213) 509-0474

Tecmar Inc.
6225 Cochran Rd.
Cleveland, OH 44139
(216) 349-0600

Turn your own Commodore 64 into a graphic workstation: $149

FLEXIDRAW™ is the exciting and affordable Light Pen/Software System for people who need drawings, schematics, plans, layouts or graphics in their work.

A REAL WORKING TOOL THAT'S FUN TO USE. Be more productive right away. Draw and fine-tune design ideas right on your CRT . . . with your Light Pen. Then generate drawings or hard copies in black and white or color quickly and effortlessly.

And because you're unconcerned with computer commands you can focus on what you're working on. Fact is, work becomes a lot more fun.

FEATURE-RICH GRAPHICS AT YOUR LIGHT PEN TIP. Select from a wealth of drawing modes listed on the screen. Move fluidly from freehand drawing to lines, boxes, arcs, circles, ellipses, zooms, cross hairs, grids, Plus, flips, rotations and split screens . . . virtually all the functions you'll ever need.

FLEXIDRAW gives you the freedom to manipulate and handle images as you work. Create your own templates and patterns to go with the standard Flexidraw templates and 512 pattern fills. There's seven different type styles for text. And 16 hi-res colors may be added. There's also a Sprite Editor and Animator. An exclusive Transgraph feature even lets you send graphics to distant locations via modem.

EXCLUSIVELY ENDORSED BY THE U.S. COMMODORE USERS GROUP. Test draw FLEXIDRAW yourself at your nearest Commodore Software dealer now.

P.O. Box 85152 MB 290, 7677 Ronson Road, San Diego, CA 92138, (619) 268-8792

Flexidraw™

"A Pen for Your Thoughts"

©INKWELL SYSTEMS, 1984

Commodore's Port

John J. Anderson

Avast, maties! Lower the mains'l and heave to. Put in to Commodore's Port for a short while and replenish your stores of unbiased news, reviews, and applications for your Commodore 64. We've got lots to do, so full steam ahead!

You might have heard by this time that Jack Tramiel, founder and former head of Commodore, is now the head of Atari. Lineups in the microcomputer industry change as quickly as in professional baseball, don't they? Well, we'll see if Jack can keep up the same impressive batting average for a team in Silicon Valley. He certainly has his work cut out for him.

Talk About Mixing Metaphors!

Got a phone call and a care package from Deep Boat the other day. Though he has watched many of his compatriots jump ship in the latest round of battle, he remains loyally at his station, awaiting further orders. Seems a bit of shanghaiting has been going on, and Commodore is not at all happy with the idea that Mr. Tramiel has assembled his order of command with deserters and mutineers from Commodore itself. But Deep Boat will have none of it. He's a Commodorian through and through. While expressing his respect for Mr. Tramiel, he also underscored his confidence in Commodore—assuring me that they are not about to allow TTL (Tramiel Technologies Ltd.) Atari to wrest away Commodore's claim to number one in home computers. (Read Outpost: Atari for more information regarding the Tramiel take-over.)

Speak of the Devil

Deep Boat backed up his prediction with some very hard evidence: a beta copy of the arcade game, *Satan's Hollow*, for the C-64. I could hardly believe my eyes when I booted up the game. It compares extremely favorably with the arcade version, which (you may or may not remember) featured absolutely incredible graphics.

Though *Satan's Hollow* is to some degree a rehash of Galaxian, it is an extremely engaging rehash, and it has some neat little features all its own. As an arcade game translation, it is utterly superlative, as Deep Boat assured me it would be. The sound effects of the game are also outstanding—completely true to their arcade namesake. Without a doubt, the Commodore 64 has established itself as a graphics and sound machine of unimpeachable repute.

Deep Boat, best of luck, and keep it coming. You never steer us wrong.

Simon's Sight and Sound

If you have followed the last couple of columns, you know that we have been running a tutorial series from *Commodore 64 Sight and Sound*, a new book available from Creative Computing Press. This month we excerpt a section on hi-res graphics from Simon's Basic.

You may be one of the few C-64 owners around who still hasn't gotten a hold of Simon's Basic. That's a shame, since you are missing out on just about the finest programmer's learning tool available to you. I strongly recommend that you purchase it (it is priced very reasonably) —along with a copy of *Sight and Sound* of course. If you are having trouble locating the book at your local bookstore or software dealer, give us a call here at the magazine, and order one direct.

Enough shameless plugging. On to the good stuff.

Hi-Res Graphics

Simon's Basic puts the powers of high-resolution graphics at the fingertips of the beginning programmer. As opposed to low-res character graphics, hi-res allows you to plot geometric shapes. With just a few simple commands, you can build complex, multicolor pictures.

HIRES

The HIRES command tells the C-64 to go into high-resolution mode and in what screen and plot color to do so. By plot color, we mean the color the C-64 will use to draw on the hi-res background color when we get around to drawing on it. The format is

```
HIRES screen color, plot color
RETURN
```

A HIRES command cannot work on its own, however. It needs some help.

LINE

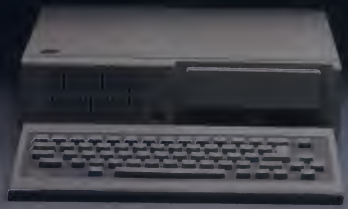
The LINE command allows you to draw a line on the hi-res screen from one point to another. The program

```
10 HIRES 0,1
20 LINE 20, 40, 300, 250, 1
30 GOTO 30
```

draws a diagonal line across the screen. The format for the LINE command is as follows:

```
LINE beg x, beg y, fin x, fin y, plot
type
```

where beg x is the beginning x value of the line, beg y is the beginning y value, fin x is the final x value, fin y is the final



IT'S NOT HOW MUCH YOU PAY.

IT'S HOW MUCH YOU GET.

The computer at the top has a 64K memory.

It has the initials I, B, and M. And you pay for those initials—about $669.

The Commodore 64™ has a 64K memory.

But you don't pay for the initials, you just pay for the computer: $215. About one third the price of the IBM PCjr.™

The Commodore 64 also has a typewriter-type keyboard with 66 typewriter-type keys. (Not rubber chicklet keys like the IBM PCjr.)

It has high resolution graphics with 320 x 200 pixel resolution, 16 available colors and eight 3-dimensional sprites.

It has 9-octave high fidelity sound.

The Commodore 64 is capable of running thousands of programs for home and office. And if you add a printer or color monitor, disk drive and a modem—all together it just about equals the price of the IBM PCjr all alone. With no peripherals.

So you can buy a computer for a lot of money.

Or buy a lot of computer for the money.

COMMODORE 64

IT'S NOT HOW LITTLE IT COSTS,
IT'S HOW MUCH YOU GET.

y value, and the plot type is set to 0, 1, or 2. For now we will always use a plot type set to 1.

At first you are bound to be confused by the placement of x and y plots across the screen. Figure 1 may help give you a feel for the hi-res screen.

Play around with the x and y values for line plots. Before long you will develop a rough idea of where plots occur on the hi-res screen.

Now let's get a taste of the animation potential of Simon's Basic in hi-res. The simple program shown here as Listing 1 allows you to create an animated line

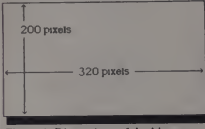


Figure 1. Dimensions of the hi-res screen.

plot. You can build on this basic principle to create sophisticated moving pictures. It is used simply here, but can be used in sophisticated ways as well.

As you can see from the listing, all you need to do is build a counter for the x and y values, then set up a loop. Each time through the loop, the line plots to the incremented x and y values. The result: an animated drawing.

REC

Any guess what the REC command allows you to draw on a hi-res screen? You got it, a rectangle. As with LINE, it takes a while to get used to the numbers you need to use with the rectangle command, but you can get the hang of it with a bit of practice.

First, you tell the computer where you want the top lefthand corner of the rectangle to be. You do this by specifying X and Y coordinates. The only way to get a good feel for these coordinates is to experiment.

Next, you tell the computer how wide and how long you want the rectangle to be. Again, it takes practice to learn what numbers give you the result you want.

Listing 2 is an example of the use of the REC command. Type it in, and see where this set of coordinates places the triangle. The command is

REC beg x,beg y,width,length,plot type

where beg x and beg y are the coordinates of the top lefthand corner of the rectangle, width is the horizontal width of the rectangle, and length is the vertical length of the rectangle.

What about that strange number 1 tacked on the end of the expression? Well it tells the computer that this is a normal plot. We will look at inverse and clear plots just ahead. For now, all you need to know about is plot type 1.

First, look at Listing 3. It puts the REC command to work for you in an animated plot.

Pretty good results for just a wee bit of effort, wouldn't you say? This program is very easy to understand once you get a grip on the REC command. It is a loop, and each time through the loop it increments the corners of the rectangle. The top lefthand corner moves down and to the right, while the bottom righthand corner moves up and to the right. This gives a three-dimensional effect. We stop plotting when X gets to 251, so we won't error out. We actually begin plotting the entire figure again, but you can't see it happen, because it is plotting right over itself.

A Closer Look at Plot Types

Let's try to gain an understanding of plot types by playing with the plot types in our last example program. We'll change the plot type of the program by changing the last value in the REC statement, the plot type, to 0. What happens?

If we specify a plot type of 0, nothing gets plotted. If a plot type 0 encounters a plotted line, it will actually erase it. This comes in handy for "undrawing" animated shapes. Listing 4 provides an example.

As we saw earlier, a plot type of 1 is a normal plot, drawing a shape in the plot color across the background. No need to look any further at that plot type right now.

A plot type of 2 "inverses" whatever it encounters. It turns a plot off if it is on, and on if it is off. We can use a plot type of 2 to make our animated rectangle change shape continously as it does in Listing 5.

Multi-Res—Best of Both Worlds

So far we have been looking at the hi-res mode, in which we can put one plot color on top of one background color. Now get ready for the multi-res mode, which allows us to plot in three plotting colors, and with a little sneaky footwork, even more.

The multicolor mode, which we shall call multi-res, is a variant of the hi-res mode—with half the horizontal resolution but three times the color. It is up to you to decide which resolution to use with which graphics trade-offs.

MULTI

The MULTI command, when used following a call to the HIRES command, will cause all plotting to take place in multi-res. Format for the command is

HIRES plot color, background color:
MULTI color 1, color 2, color 3
plot color = 0 - 15
background color = 0 - 15
color 1 = 0 - 15
color 2 = 0 - 15
color 3 = 0 - 15

Note that a MULTI command must always follow a HIRES command. The three parameters following MULTI define the plot colors you wish to use.

Each plot color is selected by its MULTI command designation as the plot type in a plotting command. We will clarify this just ahead. Listings 6 and 7 are some examples of hi-res graphics transposed into multi-res.

In multi-res, each pixel is twice as wide as it appears in hi-res. As a result, multi-res has half the horizontal resolution of hi-res. Still, multi-res has a pretty respectable look, and the trade off results in the ability to put multicolors on the screen.

Plot Types in Multi-Res

Plot types work slightly differently in multi-res than they do in hi-res to account for the additional colors available. A plot type of 0 still functions to clear a dot. A plot type of 1 plots a dot in color 1. A plot type of 2 plots in color 2, and a plot type of 3 plots in color 3.

If you specify a plot type of 4, the plot will inverse dot color—in the following fashion:

color 0 changes to color 3
color 1 changes to color 2
color 2 changes to color 1
color 3 changes to color 0

This plot type can give you animated rainbow effects for a small expenditure of code.

Creative use of plot types can make animation a cinch. Listings 8 and 9 are some starting points.

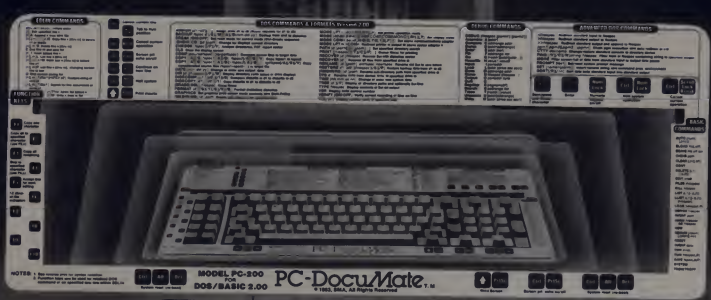
We'll continue our look at hi-res graphics next month. Until then, keep yourself booted up, and enjoy. ■

Listing 1.

```
1 REM LISTING 1
2 REM ANIMATED "LINE" PLOT
3 REM
4 REM-----------------------
10 HIRES 0,7:Y=0
20 LINE 0,0,300,Y,1
30 Y=Y+4:IF Y>250 THEN 50
40 GOTO 20
50 GOTO 50
```

Listing 2.

```
1 REM LISTING 2
2 REM THE "REC" COMMAND
3 REM
4 REM-----------------------
10 HIRES 0,7
20 REC 50,50,120,120,1
30 GOTO 30
```



The $14.95 Peripheral

That Puts Your Computer's Commands Where They Belong And Your Manuals On The Shelf.

Now, you can command new computer productivity. Discover how much easier your personal computer is to use when the commands are at your fingertips. PC-DocuMate™ keyboard templates can save you time and frustration. You can recall needed commands, options and formats. Quickly.

Professionally designed and comprehensive. Each PC-DocuMate template has been designed by a software expert. Commands are logically and functionally organized so you can get the most from your software. And our templates are comprehensive reference aids which use both sides to document a product or a system. Completely.

Durable and guaranteed. PC-DocuMate templates are silk-screened onto durable, high-gloss plastic to our exacting specifications. Each template is printed on both sides and color-coordinated to complement your PC. And your satisfaction is guaranteed. Fully. Or your money back.

Save time and enjoy greater productivity. Order your PC-DocuMate without delay.

Lower prices for better design. With PC-DocuMates, you get two-sided templates for less than a single-sided template from other manufacturers. And you get a better designed template. Order direct or ask your local dealer.

PC-DocuMates now available...

IBM PC/XT & COMPAQ — $14.95

DOS/BASIC 2.0 & 2.1 • DOS/BASIC 1.1 • Lotus 1-2-3 • Symphony • dBASE II • dBASE III • Framework • WordStar • MultiMate 3.20 • VisiCalc • Multiplan 1.00 or 1.06 • Volkswriter Deluxe • SuperCalc[3] • PeachText 5000 • EasyWriter II • Turbo Pascal • WordPerfect • Do-It-Yourself

COMMODORE 64 — $12.95

BASIC & more • Calc Result • EasyScript • Quick Brown Fox • Do-It-Yourself
(CBM 64 templates are printed on one side only)

IBM PCjr. — $12.95

DOS/BASIC 2.1 • MultiMate • dBASE II • Do-It-Yourself

APPLE IIe — $14.95

WordStar • VisiCalc • dBASE II • AppleWriter II • Quickfile • Do-It-Yourself

If your favorite software package is not shown here, you can order our "Do-It-Yourself" template (which includes a special pen and eraser) and develop your own custom keyboard template

Our Guarantee. Use your template for 20 days. If you are not completely satisfied return it to us (undamaged) for a full refund

HOW TO ORDER: Send personal check, money order or MasterCard/VISA credit card information. Please add $1.50 for shipping and handling per order; foreign orders must add $5.00 per unit (except Canada). US funds only. Sorry, but no COD's. NC residents add 4% sales tax. Corporate quantity discounts available. Dealer inquiries invited. And for faster service on credit card orders,

Call Toll Free
1-800-762-7874
(in North Carolina) 919-787-7703

SMA
SYSTEMS MANAGEMENT ASSOCIATES
3700 Computer Drive, Dept. CC
Raleigh, North Carolina 27609

The following trademarks are acknowledged: IBM Corp. IBM, IBM PC, XT & PCjr; Ashton-Tate: dBASE II, dBase III, Framework, Information Unlimited Software, Inc. EasyWriter II, Lotus Development Corp. Lotus 1-2-3, Symphony, SoftWord Systems, Inc. MultiMate, Microsoft Corp. Multiplan, PeachTree Software, Inc. PeachText 5000, Sorcim Corp. SuperCalc[3], Living Videotext Software, Inc. Volkswriter, MicroPro International Corp. WordStar, QuickTax, Quick Brown Fox, Handic Software ab. Calc Result, Commodore Business Machines, Inc. EasyScript, VisiCorp. VisiCalc, Apple Computer, Inc. Apple IIe, AppleWriter II, Quickfile, Borland International, Inc., Turbo Pascal, Satellite Software International, Inc. WordPerfect

PC-DocuMate is a trademark of Systems Management Associates. ©SMA 1984

CIRCLE 195 ON READER SERVICE CARD

Verbatim Datalife Diskettes

Box of ten 5¼" Datalife diskettes with envelopes, labels and reinforced hub-rings. FREE PLASTIC LIBRARY CASE.

5¼" SS/DD		5¼" DS/DD	
MD525-01	$22.95	MD550-01	$31.95
MD525-10		MD550-10	
MD525-16		MD550-16	
5¼" SS/QD		5¼" DS/QD	
MD577-01	$34.95	MD557-01	$43.95
MD577-10		MD557-10	
MD577-16		MD557-16	

Printers

Gorilla/Banana Parallel or serial Det Matrix 120CPS	$121.00
Gemini 10X-120CPS Bi-Directional	$259.00
Prowriter 8510AP 10"	$348.00
Color printer/ploter, C. Itoh CX-4800. 4 colors, 10" Parallel or Serial	$555.00
Powertype, Daisywheel Letter Quality	$365.00

Shipping and Handling $3.00 for any order of diskettes $8.00 for printers, C.O.D. extra and $1.00. We accept Visa, Mastercard and American Express credit cards at no extra charge. Illinois residents please add 7% tax

Call us now toll free ANYWHERE in the U.S.
Orders only: 1-800-227-3800 Ask for "Smart Data"
7 Days a Week, 24 Hours a Day
Other information: (312) 256-4456
9am to 8pm (central), Mon. through Sat.

SMART DATA INC.
P.O. Box 297
Wheaton, IL 60189
(312) 256-4456

CIRCLE 186 ON READER SERVICE CARD

Now available to everyone!
Computel Publishing Society
Computel System presents

The one you've all been waiting for

Computel
PUBLISHED MONTHLY

If subscription or Computel brings any of these exciting enhancements for the duration of the membership:

ONE YEAR SUBSCRIPTION: $ 14.00
CANADIAN: $ 16.00 FOREIGN: $ 24.00
SAMPLE COPY: $1.00 BACK ISSUES: $ 2.00

• The Membership Proof entitles you to honorable looking medallion worth framing, created by the Computel staff to signify membership to the Computel System.
• Hundreds of WHOLESALE and below wholesale ground electronic gift items. Computel Buying Power is for you and for you only the Computel Merchandise Distribution Plan – a chance to purchase what you can use at a fraction of retail price!
• Group discounts when buying computer systems, supplies, and components with the other members of the System. Huge discounts and factory shutdowns that we are constantly working on they occur.
• Discounted prices on computer hardware and software purchased through the Society at affiliated outlets around the world!
• A comprehensive of the newest computer systems and equipment on the market BEFORE making an investment through Computel's advisory panel of members without publication or your hearing will direct you on where to buy, and where to get help!
• A multi-national magazine bulletin board for students, Computel Enthusiasts, Computer Hackers, Phone Phreaks, management, and any party so interested – covering the world of computers, computers and communications, among the habits and professors in a specialized display of interests, you won't want to miss!
• FREE advertising in Computel for members who wish to trade or sell their equipment, have messages, or just want to find out what's going on with other members – we can print any message you send in, and forward all replies!

SEE HOW EASY IT IS TO BECOME PART OF THE COMPUTEL SOCIETY!
24 hours a day...7 days a week
JUST DIAL OUR TOLL FREE NUMBER AND HAVE YOUR CREDIT CARD NUMBER READY (IT IT HAS) – THAT IS NOT THE PUBLICATION FOR YOU!

USA 1 800 6-COMPUTEL
CALLS OUTSIDE CALIFORNIA
CANADA 1 800 5-COMPUTEL
CALLS WITHIN CALIFORNIA

ORDER THIS GREAT OFFER BY MAIL OR PHONE TODAY!

The History of Computing	$ 14.95
The History of the Telephone	$ 19.95
The Phone Phreaks' Guide to Computers	$ 19.95
Telephone Engineering Course	$ 24.95
Computer Repair–Do It Yourself and SAVE!	$ 24.95

ALL 5 REPORTS PLUS A SUBSCRIPTION TO COMPUTEL: $ 80.00.

Computel Publishing Society
6354 Van Nuys Blvd., 161-CG / Van Nuys, CA 91401-2696

Don't miss out - Subscribe now!

CIRCLE 113 ON READER SERVICE CARD

Professional Handicapping Systems

by Professor Jones

GLD. Thoroughbred "Gold" Edition™
A "Full" featured thoroughbred analysis designed for the professional and serious novice **$150.95** complete

EGLD. Enhanced "Gold" Edition™
Gold Edition with complete Master Bettor™ system integrated onto the same disk. This powerful program will transfer all horses and scores to the bet analyst, with a single keystroke (Master Bettor™ included) **$199.95** complete

GLTD. Limited "Gold"™
Enables **Professional Handicappers** to assign specific values to the racing variables they feel are important. Create program weight based on a particular track and fine tune it for **maximum** win percentage. This program is designed for "ease of use". The user needs **no programming experience** (contains Integrated Bettor™) **$295.95** complete

DD. Gold Dog Analyzer™
The only professional dog handicapper on the market, includes
1) Speed 4) Post Lost 7)Running Style
2) Post Today 5) Distance 8) Weight
3) Kennel 6) Condition 9) All new internal weighting
10) NEW class indicator
If you are near a greyhound track, you can't afford not to use this program **$149.95** complete (with integrated Master Bettor™) **$199.95**

PPX. Professor Jones' Football Predictor, Prof. Pix™
Complete Football Analysis with **Data-Base**
1) Overlays 3) Super Plays 5) Data Base Stats
2) Point Spreads 4) "Over/Under" bets 6) Holds 100 teams
Highest percentage of winners 1983
$39.95 complete **$89.95** with Data Base Management

MHH. Master Harness Handicapper™
Professional software designed to provide a thorough analysis of all trotter and pacer races in North America and Canada. Features:

Class	Post Positions	Time Finish
Driver	Track Conditions	Time Last Quarter
Days Since Last	Trainer	Track Rating
Gender	Time In	Time Allowance

$150.95 complete with integrated Master Bettor™ **$199.95**

MB. Master Bettor™
A complement to ALL Master Handicapper programs. A perfect program designed to use results from all Master Programs to generate "best bet"
$50.95 complete

IBM™
APPLE™
TRS-80™
CPM™
COMMODORE™

Prof. Jones
1114 N. 24th St.
Boise, ID 83702

VISA MasterCard

48 HR. FREE SHIPPING

CALL
208-342-6939

TERMS: FREE SHIPPING ALL SOFTWARE Add $6.00 UPS Blue/C.O.D. Add $6.00/Add 3 weeks personal checks/ Add 4.5% ID residents/Add $6.00 outside U.S.A./ Prices subject to change

BROCHURE AVAILABLE

CIRCLE 171 ON READER SERVICE CARD

Commodore

Listing 3.

```
1 REM LISTING 3
2 REM ANIMATED "REC" PLOT
3 REM
4 REM----------------------
5 X=11Y=38:A=150:B=150
10 HIRES 0,7
20 REC X,Y,A,B,1
30 X=X+5:Y=Y+11:A=A-2:B=B-3
35 IF X>256 THEN 50
40 GOTO 20
50 GOTO 50
```

Listing 4.

```
1 REM LISTING 4
2 REM "UNDRAWING" TO ANIMATE
3 REM
4 REM----------------------
10 HIRES 0,7:X=5:Y=5
20 REC X,Y,X+10,X+10,1
30 FOR Z=1 TO 10:NEXT Z
40 REC X,Y,X+10,Y+10,0
50 X=X+11:Y=Y+1
60 IF X>300 THEN 10
70 GOTO 20
```

Listing 5.

```
1 REM LISTING 5
2 REM "REC" PLOT "UNDRAWS" ITSELF
3 REM
4 REM----------------------
5 HIRES 0,7
10 X=11Y=38:A=150:B=150
20 REC X,Y,A,B,2
30 X=X+5:Y=Y+11:A=A-2:B=B-3
35 IF X>256 THEN 10
40 GOTO 20
```

Listing 6.

```
1 REM LISTING 6
2 REM ANIMATED "LINE" PLOT
3 REM IN MULTI-RES
4 REM----------------------
5 HIRES 0,1:MULTI 4,6,2
10 X=200:Y=81:Z=1
20 LINE 0,0,X,Y,Z
30 X=X+2:Y=Y+3:Z=Z+1
40 IF Z=4 THEN Z=1
50 IF Y>250 THEN 5
60 GOTO 20
```

Listing 7.

```
1 REM LISTING 7
2 REM MORE MULTICOLORS
3 REM IN MULTI-RES
4 REM----------------------
10 HIRES 8,7:MULTI 2,4,8
20 REC 5,5,90,90,2
30 REC 10,10,30,30,1
40 REC 25,25,40,40,3
50 GOTO 50
```

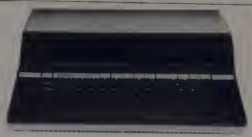
Listing 8.

```
1 REM LISTING 8
2 REM MORE ANIMATION USING PLOT TYPE
3 REM IN THE MULTI-RES MODE
4 REM----------------------
5 HIRES 0,1:MULTI 0,7,5
10 X=100:Y=0
20 LINE 0,0,X,Y,Z
30 X=X+2:Y=Y+3:Z=Z+1
40 IF Z=4 THEN Z=1
50 IF X>250 THEN 10
60 GOTO 20
```

Listing 9.

```
1 REM LISTING 9
2 REM STILL MORE ANIMATION
3 REM IN THE MULTI-RES MODE
4 REM----------------------
5 HIRES 1,8:MULTI 4,1,6
10 X=10
20 REC X,X+10,X+15,X+20,1
30 FOR Z=1 TO 10:NEXT Z
40 REC X,X+10,X+15,X+20,0
50 FOR Z=1 TO 10:NEXT Z
60 REC X,X+10,X+15,X+20,2
70 FOR Z=1 TO 10:NEXT Z
80 REC X,X+10,X+15,X+20,0
90 X=X+11:IF X<70 THEN 10
100 GOTO 20
```

Jack Tramiel, a look back, a look ahead, and the Amiga Lorraine revisited.



Outpost: Atari

John J. Anderson

It has been nearly a year since I have manned the Outpost, and it feels good to be back. Rest assured that Dave and Sandy Small will return next month, to continue with their Atari machine language tutorial. But I just couldn't resist stepping back into the Outpost to report on Atari's condition following Warner's abrupt sale of the company.

Many of you Atarians who have contacted me through the magazine or visited the *Creative Computing* SIG on CompuServe (PCS-22) know of my continuing loyalty to the Atari machine—and that changing times have not changed those feelings. But undeniably, times have changed for Atari computers. After suffering losses of over a billion dollars in the past two fiscal years, Warner Communications frantically started hunting for a buyer. Their unlikely find was none other than Mr. Jack Tramiel, who as CEO of Commodore International, personally helped

Atari bite the dust in the price wars of 1982. Mr. Tramiel founded Commodore and built it from a storefront operation into a billion dollar company.

He left his brainchild in January, traveled the world for a couple of months, and then negotiated the purchase of Atari Corporation (now under the umbrella of Tramiel Technologies Ltd.) in July. It should be noted that Warner Communications retained the coin-operated arcade game branch of Atari, as well as Ataritel, the experimental telecommunications group. You remember Ataritel, right? Its great claim to fame is that it has survived for nearly three years without ever announcing a product.

So the very man whose name once spelled doom for Atari is now its last chance for salvation. No small irony there, but also cause for hope, I would assert. If there is one thing Mr. Tramiel knows about, it is marketing, and lousy marketing helped kill the old Atari. It may be that Jack's hubris will get the better of him this time, and that nobody can save Atari. Jack may also be the one person in the world who can turn the company around.

I was impressed with his very first moves as CEO and chairman. He laid off almost all middle and upper level managers and treated Atari's recovery as if it was the start-up of a wholly new company. This, I believe, was the only successful way to plan a comeback. If too much of the old Atari remained, the deck would be fatally stacked. The company truly needed a totally fresh start, and the first thing Tramiel did was to see that Atari got it.

Nobody is really sure what Jack Tramiel will do to and for the Atari product line. It seems likely that the Atari 800XL will continue to be sold, at least through early 1985. As for everything else, all bets are off. It is now highly unlikely that the 1450 XL, with built-in parallel bus disk drive and modem, will ever see the light of day.

The company truly needed a totally fresh start, and the first thing Tramiel did was to see that Atari got it.

Jack is savvy enough to know that the 1450 is last year's product. He wants to get *next* year's out the door as soon as possible. And the 1450XL is not it. Hence we'll be hunting for another machine to top the Outpost column masthead. We have a hunch, but more on that up ahead.

The only thing we are quite sure of is Tramiel's confidence. "We'll be number one within a year," he told *Infoworld*.

A Look Back

The Atari was my first computer, and it was probably somewhat due to the Atari that I got a break in the world of microcomputer journalism. Atari was the first computer company I ever wrote about for money. Most of the comment was praise, but I was first critical of

Dirty Power In

Ultra Quiet

Computer Protection

KLEEN LINE® CONDITIONER

Prevents:

- Computer Damage
- Brownout Interruptions
- Lightning Spike Damage
- Disruptive Line Noise
- Program Errors

Regulator • Filter • Suppressor

KLR-250A	250 Watt Load	$291.95
KLR-250A-ISO	250 Watt Load; Patented Filter Isolated Sockets	$346.95
KLR-500A	500 Watt Load	$390.95
KLR-500A-ISO	500 Watt Load; Patented Filter Isolated Sockets	$445.95

Shipping: $12.75 Land; $45.50 Air

Ask Your Local Dealer

ESP® Electronic Specialists, Inc.
171 South Main Street, Box 389, Natick, Massachusetts 01760

Toll Free Order Desk 1-800-225-4876
MasterCard, VISA, American Express

CIRCLE 108 ON READER SERVICE CARD

MATH ANXIETY?

Help yourself with the INFINITE MATH WORKBOOK SERIES from Olympus Educational Software. These programs provide rigorous practice and review from thousands of randomly generated math problems. All programs are challenging and provide examples, feedback, and scoring. Study at your own pace.

HIGH SCHOOL MATH

Functions and Graph I
Functions and Graph II
Expansion of Expressions
Simultaneous Equations
Statistics and Graph
Greatest Common Factor-Least Common Multiple
Quadratic Equations I
Quadratic Equations II
Beginning Geometry I
Beginning Geometry II
Linear Equations
Factoring

All programs $39.95 each. We accept checks, VISA or MASTERCARD.
Add 3% shipping. CA residents add 6% sales tax.

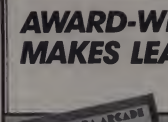
For Your: APPLE — COMMODORE 64
NEC PC-6001

OLYMPUS EDUCATIONAL SOFTWARE
Dept. CC10, 1660 No. Hotel Circle
Suite 310
San Diego, California 92108
(619) 296-8555

. . .software for inquisitive minds. . .

CIRCLE 168 ON READER SERVICE CARD

AWARD-WINNING WEPCO SOFTWARE MAKES LEARNING MATH EASIER THAN EVER!



Algebra Arcade™ by Dennis Mick, Mike Konemann, Richard O'Farrell, and Jerry Isaacs

"...exemplifies everything that's right about educational software. The program gives an exciting, engrossing visual interpretation of algebraic equations."

—United Feature Syndicate

"This lively, colorful, entertaining, and educational format far exceeds anything a textbook could provide."

—Curriculum Review

Includes 1 disk and a User's Guide. Runs on Apple® II + / IIe/IIc, IBM® PC, and Commodore 64™

1984 creative computing OUTSTANDING SOFTWARE AWARD

WEPCO Electronic Study Guides for Trigonometry and Precalculus Algebra by Robert Steinbach, David Lunsford, and Roy Dobyns

Developed by math educators, these 2 guides motivate students to solve trigonometry and algebra problems at their own pace.

Each ELECTRONIC STUDY GUIDE includes 6 disks and a User's Guide. Demonstration disk available. Runs on Apple® II + /IIe/IIc.

Algebra Arcade is a trademark of Wadsworth, Inc. Apple is a registered trademark of Apple Computer Inc. Commodore 64 is a trademark of Commodore Electronics Limited. IBM is a registered trademark of IBM Corporation.

WEPCO Electronic Blackboard Series: Algebra, Trigonometry, and Function Plotter by Richard O'Farrell, Dennis Mick, Jerry Isaacs, and Mike Konemann

This series helps students construct graphs of functions by clearly animating difficult concepts.

ALGEBRA ELECTRONIC BLACKBOARD: 2 disks and a User's Guide
TRIGONOMETRY ELECTRONIC BLACKBOARD: 1 disk and a User's Guide
FUNCTION PLOTTER: 1 disk and a User's Guide
DEMONSTRATION DISK: 1 disk and a User's Guide

Runs on Apple® II + /IIe/IIc

Also from WEPCO— ***NEW BOOK!***

Educational Software by Raymond Spangenburg and Diane Moser

Gives teachers and parents key evaluation tools so they can buy software wisely

160 pages, 7½ x 9¼", paperbound, illustrated

WEPCO books and software are available at most booksellers and computer stores. If they are not in stock, ask your favorite store to order them. For a complete catalog, call toll free 800-831-6996, in California call 415-595-2350.

WADSWORTH ELECTRONIC PUBLISHING COMPANY
10 DAVIS DRIVE
BELMONT, CA 94002

CIRCLE 201 ON READER SERVICE CARD

Atari in an *Infoworld* editorial way back in 1981. Atari was at the time taking full page ads in trade papers telling pirates that "the game is over." Talk about a terminal case of the smuggies and a wrong-headed approach to public relations. Aside from criticizing this, I decried the company's noncrediting of individual programmers on their software packages and wrote that Atari tended toward "schizophrenia" because of its size and the way it competed against itself. I suggested that a new approach was necessary if the company was to avoid a marketing problem and an image problem.

When I finished my first Outpost:Atari in November of 1982, Atari was finishing up a smash hit year. Video games were the American rage, and Atari was *the* video game company. It seemed they could do no wrong, and top-level managers began to believe in their own infallibility. It seemed, too, that the decision had been made to allow the superlative 400 and 800 computers to languish, while the company spent millions promoting games.

Right up until the end, that stupendous miscalculation prevailed: witness the unbelievable introduction of the model 7800 videogame unit weeks before the old company's demise. Meanwhile the computer line had been cheapened and made less compatible with itself. *No-*

Atari is in a precarious state now with one foot on Jack Tramiel and the other on a banana peel.

body near the mechanism of decision-making (if there was any such mechanism at Atari) ever had much of an idea of what a product line should really be about. And about the last thing they ever would have done was listen to somebody who did.

After a year manning the Outpost, I had grown depressed. My marketing criticisms had become a monthly soap opera and were more caustic each time around. My feelings about Atari the company became counterproductive to the column. My dealings with Atari corporate were at an all-time low, and it seemed as if there was a new public relations director almost weekly. Atari had begun to lose money, you see, and no amount of Maalox would help. The panic stampede had, by then, warmed up to only a weekend jogger's pace, but already everybody had his sneakers on.

A year later, I can't resist getting in a quick "I told them so." If only they had made the 5200 game machine 400/800 compatible and offered an optional keyboard peripheral. If only they had killed the 1200 on the drawing board. If only they had brought out the 1450 last fall. If only they had acted early to change their image. If only they had protected the morale and egos of their most creative minds. If only they had realized that the videogame and the low-end home computer were no longer separate markets. If only they had cut costs without cutting quality. If only the XL series had been truly compatible with the old Ataris.

If only they had done what I was saying all along, right here in this column, they wouldn't have fallen down and gone bing bang boom. And you know what they say about "the bigger they are."

A Look Ahead

Hey, I *know* it's easy to look back and write history and say "they should have listened to me." The hard part is to see into the future and determine where the *avoidable* mistakes are. The trick is to continue predicting things right. Atari is in a precarious state now with one foot on Jack Tramiel and the other on a banana peel. If it falls again, this time its frail bones will shatter. It will go to that big Chuck E. Cheese parlor in the sky.

In Ridley Scott's vision-of-the future movie "Blade Runner," everywhere you look there are Atari billboards and signs. It must have seemed a safe bet back in 1982 that Atari would be a company to survive well into the 21st century. Videogames made twice as much as movies that year (over $7 billion). Upon viewing the film today, the signs seem dated. Timestamped, you might even say.

What are you going to do, Jack, to revive the battered behemoth? How are you going to get people to stop buying IBMs and Apples and your own darned Commodores and start buying TTL Ataris? Do you know what people want? Do you know some minds who can deliver it? Can you get it down to an attractive cost without sacrificing quality and performance? Can you manufacture it in quantity within a reasonable amount of time?

Certainly not out of the blue, no. You need to find a product worth putting your name on, worth putting the Atari name on. And I've got news for you, Jack. I know what that product is.

What do micro buyers want? Easy. They want 1000K RAM, 10Mb of hard disk space; 3-D color animated graphics with a resolution indistinguishable from broadcast TV; a built-in modem, laser-disk interface, and printer; stereo sound on a par with a Moog; and ease of use like the Macintosh. And they want it for $99.95. Deliver this with a free piece of software like a flight simulator that *really* looks and feels like flying through the sky, and you can have your wish. You can be number one again. And maybe stay there for a while.

But this is a machine for the drawing board. It's not the one available now to supplant the tired old Atari computer line. What to glue your name on in the meantime, while you await the dream machine? You've got to get as close to that set of specifications as you can, at as close to the price. Most important, you

Using bit-plane animation, an approach used by machines costing upwards of $50,000, the Lorraine creates fluid movement in multi-color hi-res.

must be willing to take a risk. If you introduce just another IBM-compatible, you will surely go down the tubes. Sure, IBM compatibility would be nice, but you had better be able to do a whole lot more. Fact is, the IBM standard is mediocre, and most of the public knows that by now. You need something more, much more, much much more. And now I'll give you the name, address, and telephone number of the company to get in touch with.

Who'll Stop Lorraine

Way back in the April 1984 issue of *Creative Computing* (p.150), I reported on a new computer from Amiga, a company known only as a manufacturer of joysticks and a kludgy foot-controlled joystick called the Joyboard. I had been ready for another big presentation resulting in a big letdown, but I was surprised. The machine, code-named Lorraine, was a total knockout. I'll stand by the comment I made then: "Suffice to say it is the most amazing graphics and sound machine that will ever have been offered to the consumer market."

The Lorraine is based on a 68000 microprocessor, running at 8MHz—faster than the Macintosh. The CPU is backed up by three custom VLSI

MOVING?

Please let us know 6 weeks in advance so you won't miss a single issue of CREATIVE COMPUTING.

Attach your old label where indicated and *print* your new address in the space provided. Please be sure to include your mailing label whenever you write us about your subscription. It helps us to serve you promptly.

Write to: P.O. Box 5214, Boulder, CO 80322

- ☐ Change address only
- ☐ Extend subscription
- ☐ Enter new subscription—one year $19.97
- ☐ Payment enclosed
- ☐ Bill me later

AFFIX OLD LABEL

If you have no label handy, *print* old address here.

Name_____

Address_____

City_____

State_____ Zip_____

☐ Charge ☐ American Express ☐ Visa ☐ MasterCard

Number_____ Exp. Date_____

Signature_____

NEW ADDRESS HERE

Name_____

Address_____

City_____

State_____ Zip_____

Add $5 per year in Canada, $10 per year all other foreign countries. Please allow 60 to 90 days for delivery of first issue.

What do you get when you cross 1200 baud, free on-line time, and extra features at a price Hayes can't match?

MultiModem.

Data Rate?

The MultiModem gives you a choice—either 1200 or 300 bits per second. So you can go on-line with the information utilities. Check out bulletin boards. Dial into corporate mainframes. Swap files with friends.

On-Line Time?

With the MultiModem you get CompuServe's DemoPak, a free two-hour demonstration of their service, and up to seven more free hours if you subscribe. You also get a $50 credit towards NewsNet's business newsletter service.

Features & Price?

Of course, the MultiModem gives you automatic dial, answer, and disconnect. Gives you the Hayes-compatibility you need to support popular communications software programs like Crosstalk, Data Capture, our own MultiCom PC, and dozens of others. Gives you a two-year warranty, tops in the industry.

But Better?

Yes. The MultiModem gives you features the Hayes Smartmodem 1200™ can't match. Features like dial-tone and busy-signal detection for more accurate dialing and redialing. Like a battery-backed memory for six phone numbers. All at a retail price of just $549—compared to $699 for the Smartmodem.

What do you get? The new MultiModem, from Multi-Tech Systems. Isn't this the answer you've been looking for?

For the name of your local distributor, write **Multi-Tech Systems, Inc.**, 82 Second Avenue S.E., New Brighton, MN 55112. Or call us at (612) 631-3550.

Multi Tech Systems

The right answer every time.

Trademarks MultiModem MultiCom PC Multi-Tech Systems Inc — CompuServe CompuServe Information Services an H & R Block company — NewsNet NewsNet Inc — Crosstalk Crosstalk — Data Capture Southeastern Software — Smartmodem Hayes Microcomputer Products Inc

Atari

chips to handle graphics, sound, and I/O (sound familiar?), and 128K RAM, expandable to at least 1Mb. A 5.25" internal floppy capable of storing 320K is standard. An expansion box, which will contain a second floppy drive, card slots, and space for an optional hard disk is already planned.

As for the graphics of the Amiga Lorraine, well, they nearly defy description. Using bit-plane animation, an approach used by machines costing upwards of $50,000, the Lorraine creates fluid movement in multi-color hi-res. In my earlier report I stated that the "Lorraine is capable of providing multi-color, real-time animated images on a par with (and probably superior to) Saturday morning cartoons." NTSC and RGB video outputs will be provided, as will 80-column text display. Sound capabilities, you ask? Yes, four-channel stereo with speech capability.

The first time we saw the Lorraine at Winter CES it was a landscape of breadboards. By summer CES, the PROMs were in hand, but development systems were needed to drive them (pay no attention to that man behind the curtain). By the time you read this, the first working prototypes will be in operation. The Lorraine is a reality in search of marketing.

And without the marketing, even a machine like the Lorraine won't get off the ground—even with a custom chip set by Jay Miner (who, incidentally, designed the custom chip set for the Atari 400 and 800 machines). And that is why you are reading about the Lorraine in Outpost: Atari. In April, I called the Lorraine "finally, the next-generation Atari."

Jack, it is up to you now to be wise enough to see that this is true. Get the cost down to $1000 and perhaps someone like Thomas Dolby to be the spokesman. Then get the machine out the door—with your name on it. And remember, Mr. Tramiel, your name is Atari. Do it proud. ■

Firms Mentioned in this Column

Amiga Corporation
3350 Scott Blvd., Bldg. 7
Santa Clara, CA 95051
(408) 748-0222

MegaBasic: Rolls Royce or Subaru?

IBM Images

Susan Glinert-Cole

MegaBasic

Billed as the Rolls Royce of Basics, this language is a product of the American Planning Corporation. It features direct addressing of one megabyte of memory, a semi-compiled run-time package for zippy execution and a Forth-like language extensibility. MegaBasic edges into the domain of block structured languages like Pascal by supporting recursion and parameter passing by value or address. Like Morgan Microcomputing's Professional Basic, MegaBasic allows program lines, functions, and procedures to be referred to by name. Up to 64 separate "packages," which can be used either as separate programs or as overlays, can coexist simultaneously in memory.

The version reviewed here is 4.1, which requires an 8086/8088 processor, 128K, one disk drive, CP/M-86, MPM-86, TurboDOS, MS-DOS, or PC-DOS. Although the manual talks about several utilities that were supposed to be on the disk, only one was actually present on my copy: a program size compressor.

Numeric representation is Binary Coded Decimal (BCD) floating point with a range of -10^{63} to 10^{63}. BCD represents decimal values up to the precision limits exactly. This eliminates the "missing penny" problem resulting from round-off error; BCD is especially suited, therefore, for financial calculations. APC supplies both 8-and 14-digit precision versions of the MegaBasic system on the diskette. Unfortunately, there is no way to use any numeric representation other than BCD that I could find. Integer freaks will be disappointed.

The documentation is a handsome 304-page manual with a table of contents, index, and (bless their hearts) tabbed section dividers. Unfortunately, it is inadequate considering the tremendous number of new functions and statements introduced, not to mention a different editor. Very few examples show actual command usage in proper context, although there are several programs on the disk to study. This wouldn't be a big problem if the syntax were identical to IBM's, but there are subtle differences which you must figure out by trial and error. The documentation is also out of sync with the disk: files mentioned in the manual didn't exist, and several files on the disk were not mentioned. It didn't take too much to figure it out, but I expect the documentation to save me the trouble of having to do that. The manual needs a thorough overhaul before it can be given a passing grade.

MegaBasic has an impressive range of new functions, statements, and low level system interface tools.

Pros

I'll start with the good news: MegaBasic has an impressive range of new functions, statements, and low level system interface tools.

In addition to the usual string functions, like LEN(X$), CHR$(X), and STR(X$), MegaBasic provides a full complement of convenient extras. TRIM (X$) returns the string X$ stripped of all leading and trailing spaces. REV(X$) returns X$ with the characters in reverse order. If you prefer a more exotic order, RESEQ(X$,N) will reorder X$ depending on the value of N. The returned sequence begins with the first byte of X$, followed by the Nth byte, followed by the Nth byte after that and so on. The process wraps around to the beginning of the string and continues until all the bytes have been accessed. The manual points out that this function is useful for restructuring a string from a row/-column order to a column/row order and vice versa, sector translation tables for operating systems, and playing card games. MIN(X&,Y$, . . .) returns the minimum string expression value listed; MAX(X$,Y$, . . .) returns the maximum.

The math functions available are comparable to PC-Basic, with several extras. One unusual one is POLY(X,A(),D), which returns the polynomial evaluation of X using coefficient array A() containing D+1 coefficients, where D is the polynomial degree.

A new data definition statement included in APC is ON . . .RESTORE (line list). This statement is a member of the ON . . . GOTO family, permitting multiway branching based on some boolean value. In this case, the line list is a sequence of line numbers that contain data statements. A data read pointer is set to the first data statement on or after the line number selected in the branch, allowing data selection based on a multi-

Software That Works For Generations

6 Types of Charts and Sheets
Indices
User Fields
Notes, Footnotes and Sources
No Limits
Adapts to Your Hardware
Comprehensive
Easy to Use

And Much, Much More

Send for brochure and sample printouts.

Family Roots includes detailed manual and 2 full diskettes of programs for your Apple II, IBM PC, Commodore 64 and CP/M.*

Other genealogy software also available

Price $185. Satisfaction Guaranteed.

American Express, Visa & Mastercard Accepted

* Trademarks for Apple Computer, Inc., International Business Machines, CBM, Inc., & Digital Research

Family Roots

QUINSEPT, INC.
P.O. Box 216, Lexington, MA 02173
(617) 862-0404

CIRCLE 174 ON READER SERVICE CARD

Apple II +

- 64 K Ram
- Apple Drive
- 12" Monitor
- 3.3 DOS

$799.00

90 Day Warranty

icb
INTERSTATE COMPUTER BANK

(415) 968-6811
2384 El Camino Real W.
Mtn. View, CA 94040

CIRCLE 151 ON READER SERVICE CARD

way decision.

Another valuable statement is LOCAL (variable list). LOCAL creates temporary simple variables which can be used within a subroutine, user defined function, or variable. Arrays cannot be used as a LOCAL variable. This would allow you, for example, to declare X in the body of the main program, and use X within a subroutine, without affecting the value of the original X. Variables are not usually permitted scope in Basic, although scope is a regular feature of structured languages.

Two statements are used to create functions and procedures that will be "shared," e.g., available, from outside the main program. This is similar to the assembly language attribute PUBLIC. Functions, whether shared or not, can be multi-line, and do not have to begin with FN.

The segmentation and overlay scheme of MegaBasic is implemented by eight new statements. DEF SHARED (function or procedure) and DEF SHARED DATA (list of variable names) are used to define shared functions, procedures, and variable names. INCLUDE (list of package names) will bring a list of program files containing packages into memory for later execution. LINK (program name) [,(common variables)] will terminate the current program, erase it from memory, load the program specified by the string expression, and execute it. Programs can be dynamically merged during execution with the MERGE (program name) statement. If, for some reason you want to remove program lines after they have been executed, you can do this with the DEL (line number—line number).

The program appears robust; no matter what sort of strange commands I issued, MegaBasic coped without a single lockup.

A wealth of file and device I/O function, which are sorely missing from PC Basic, are included. DIR$ returns file names, one at a time, from the directory, permitting sequential file processing. FILE(S$) will look up the file S$ in the directory and return a 1 if present, a 0 otherwise. FILEPOS(X) returns the current position of the file pointer from the beginning of the open file X. FILESIZE(X) returns the file size in bytes or, if placed on the left side of an assignment statement, will set the file size to the number of bytes on the righthand side. SPACE(X) returns the number of bytes available on the disk drive.

The program appears robust; no matter what sort of strange commands I issued, MegaBasic coped without a single lockup. The error messages were not always helpful, but by and large, it was relatively easy to figure out what the problem was.

Cons

And now folks, for the bad news. As already stated above, the documentation is inadequate. To begin your journey in the Rolls, you are instructed to type BASIC. This results in a FILE NOT FOUND error; there is no file on the disk with such a simple name. Instead, the programs are called mysterious names like MSDBASO8.EXE. A little poking around in the manual will shed some light on the purpose of these files, but it is a bit rude to have the door handle come off in your hand.

The editor in MegaBasic is reminiscent of, but not nearly as good as, EDLIN. Its basic philosophy is very primitive line editing. This is performed by a thoroughly un-mnemonic group of CTRL-letter keystrokes, some of which do not perform as described in the manual. Editing is really weird. You can't move backward and forward on the line; the cursor keys are disabled. Instead, you can enter a line (and do destructive backspacing), or copy an old line letter by letter, word by word, or entirely. Although the manual says you can move backward by word with the CTRL-W command, I found this did a destructive backspace by word (the manual says this is done with CTRL-T). Inserting characters in a line is signaled with a CTRL-Y, which puts a left angle bracket in the line. You enter the desired letters, and emit another CTRL-Y (putting a right angle bracket in the line), when done. Although I entered only short programs, I found editing by this method absolute agony.

In addition to these line commands, MegaBasic has global search move, copy, and replace facilities. There is some mimimal syntax checking when a line is entered; some syntax errors are caught, but others aren't detected until the program is actually run. The superb syntax checking of Professional Basic spoiled me some. After all, IBM Basic doesn't have dynamic syntax checking. I guess I found the half-hearted attempt of MegaBasic more irritating than no error checking at all.

Another problem, which may be due to the poor documentation, is that there doesn't seem to be any way to list a pro-

gram to the printer. Listing 2 was produced by good old Shift-PrtSc. One other point: no sound (not even the primitive but useful beep) or graphics statements are currently implemented.

Listing 1 shows the same PC-Basic Sieve program as last month. This was loaded directly into MegaBasic as an ASCII file. MegaBasic did some partial conversion to its own syntax, (STEP was changed to BY, for example). Other syntax incompatibilities were left for me to change manually (the abbreviated REM statement, for example). After all this, the program ran incorrectly, because of the way MegaBasic handles GOTOS within an IF . . . THEN loop. I couldn't

If your IBM PC is early vintage, you can give it a silicon facelift with a modest expenditure of $30.

figure out from the manual how to do it any other way than the kludge in lines 190 and 195. After all this effort, the program times were very disappointing (see Table 1). MegaBasic is not for programmers who want to hear the sound of screeching bits and see smoke issuing from the 8088 during execution.

In short, MegaBasic isn't exactly a Roll Royce. It reminds me more of my Subaru. Bristling with bells, whistles, and knobs to twiddle, it is slow to accelerate, dependable, and runs like a clock.

Miniature Vignettes

If your IBM PC is early vintage, you can give it a silicon facelift with a modest expenditure of $30 for a new ROM chip. You can tell if your machine is showing its age if its serial number is 0300960 or lower and the BIOS date is 10/19/81 or earlier. The ROM date can be checked with a four-line Basic program:

```
10 DEF SEG = &HFFFF
20 FOR X = 5 TO 15
30 PRINT CHR$(PEEK (X))
40 NEXT X
```

The new BIOS is required if you want to install an expansion chassis or hook your computer into the IBM Cluster. A new BIOS chip is supplied with these two hardware extensions, but you might find some piece of hardware that requires the update. It is available from IBM as part number 1501005; the kit includes a chip puller, instructions and, of course, the chip itself.

```
 10 '                          Sieve of Eratosthenes
 15 '                               PC-BASIC
 20 '
 30    TIME$ = "0:0:0"
 40    DEFINT A-Z: MAXINT = 1000:PRIME = 2
 50    DIM X (MAXINT)
 60    FOR I = 1 TO MAXINT STEP 2
 70      X(I) = I
 80    NEXT I
 90 '
100       PRINT PRIME;
110 '
120    IF PRIME * PRIME > MAXINT THEN 180
130       FOR I = PRIME * PRIME TO MAXINT STEP PRIME + PRIME
140         X(I) = 0
150       NEXT  I
160 '
170    FOR J = PRIME + 1 TO MAXINT
180       IF X(J) > 0 THEN PRIME = J:GOTO 110
190    NEXT J
200    PRINT: PRINT "elapsed time = ";TIME$
210    END
```

Listing 1.

```
 10 Rem              Sieve of Eratosthenes
 20 Rem                    MEGABASIC
 30 Rem
 40     MAXINT = 1000: PRIME = 2
 50     Dim X (MAXINT)
 60     For I = 1 to MAXINT by 2
 70       X(I) = I
 80     Next I
 90 Rem
100       Print PRIME,
110 Rem
120     If PRIME * PRIME > MAXINT then 180
130       For I = PRIME * PRIME to MAXINT by PRIME + PRIME
140         X(I) = 0
150       Next  I
160 Rem
170     For J = PRIME + 1 to MAXINT
180       If X(J) > 0 then PRIME = J
190       If X(J) > 0 then Goto 110
200     Next J
210 Rem
220     End
Ready
```

Listing 2.

Basic	Time (in seconds)
PC-Basic (interpreted)	13
PC-Basic (compiled)	4 (single precision)
Professional Basic	8
MegaBasic (interpreted)	20
MegaBasic (runtime)	19
MegaBasic (runtime, crunched)	18.5

Table 1. Sieve of Eratosthenes.

If you are tired of the same old black and white in the high-resolution graphics mode, one short instruction will change the foreground color to any of 16 colors. The instruction is:

```
OUT &H3D9, COLOR
```

For example, the statement OUT &H3D9,2 will show a black background and a green foreground display.

In keeping with the above short pro-

```
        $$$  ASTRO  $$$

10 CLS:KEY OFF:WIDTH 80:SCREEN 0,1:COLOR 7,0,0:DEFINT A-Z:
   A$=STRING$(2,219):S=0:S$="Y":P=32:P$="8"
20 I$="Out of Fuel (ENTER)":K$="CRASH ! (ENTER)":F=100
30 Y$=INKEY$:IF Y$="1" THEN N=-1 ELSE IF Y$="2" THEN N=0
   ELSE IF Y$="3" THEN N=1
40 F=F-1:S=S+1:P=P+N:LOCATE 24,80:PRINT:IF P<9 THEN P=9 ELSE
   IF P>80 THEN P=80
50 G=SCREEN(1,P):IF G=219 THEN I$=K$: GOTO 80 ELSE IF G=42
   THEN S=S+10:F=F+25
60 COLOR 7: LOCATE 1,P: PRINT S$;:IF RND(P)<.3 THEN COLOR 7:
   LOCATE 24,RND(P)*76+1: PRINT P$;
70 LOCATE 1,1: PRINT S;"  ";F;: COLOR RND(P)*6+1:LOCATE 24,
   RND(P)*76+1: PRINT A$;:IF F<>0 THEN 30
80 COLOR 7: LOCATE 1,1: PRINT S;"  ";F;:LOCATE 2,1:PRINT I$;:
   INPUT Y$: GOTO 10
```

Listing 3.

grams, Chris Friedl contributed an eight-line arcade game written in Basic (see Listing 3). This is one of the niftiest tour de forces I have seen in a long time. I have played many games with a code size a thousand times larger which are about a thousand times less fun. His description follows.

Astro

Astro was developed by Ascalon Software in an attempt to find out just how small a game program could be. Astro was first programmed on a TRS-80 and consisted of eight lines of coding each with fewer than 64 characters per line.

The object of the game is to dodge the asteroids while trying to pick up the fuel pods (*). The player controls the ship by using the number keys 1, 2, and 3. Pressing the 1 key will cause the ship to move left. It will continue to move left until another key is pressed, or the ship is a short distance from the left side of the screen. The 2 key stops the sideways movement of the ship, and pressing 3 causes the ship to move right.

One point is given to the player for each unit of fuel expended. In addition to 10 points for picking up a fuel pod, the player receives an extra 25 units of fuel.

Hint: Remember that the PC has a keyboard buffer. Holding down a key for any length of time starts to fill up the buffer. If you press another key immediately after holding down a key, the new direction command will be delayed. This could cause you to crash or miss an opportunity for extra fuel. For best response just tap the key you want and then release it.

Feedback

Anyone wishing to pay me a timely compliment can do so in the Compuserve IBM PC Sig or *Creative's* own Sig. I am now tuning in several times a week. ■

Mentioned in This Column

American Planning Corporation
4600 Duke St., Suite 425
Alexandria, VA 22304
(703) 751-2574
(800) 368-2248

*REDUCES DISKETTE COST 50%!

Make use of the back of your 5¼" Diskettes and SAVE

- NIBBLE NOTCH tools make it easy
- Adds the precise notch where you need it.
- Doubles diskette space or MONEY BACK!

NIBBLE NOTCH I
Cuts square notch for Apple, II, II+, IIe, III Franklin and Commodore
only $14.95 each
add $1.50 each P&H ($4.50 each foreign P&H)

DISK OPTIMIZER© SYSTEM
SOFTWARE FOR APPLE, II, II+, IIe, III & Franklin

- 469% FASTER Than Similar Programs!
- Certifies your "new" disk 100% Error Free
- Removes Bad Sectors • Adds 36th Track
- Performs Disk Drive Speed Check
- Adds DOS and More

only $24.95 each
add $1.50 each P&H ($4.50 each foreign P&H)

— OR BUY BOTH —
only $29.95
add $2.50 each set P&H ($6.50 foreign P&H)
Florida Residents Add 5% Sales Tax

SATISFACTION GUARANTEED OR YOUR MONEY BACK

ORDER TODAY!
CALL TOLL FREE: 1-800-642-2536
OR SEND CHECK OR MONEY ORDER TO
NIBBLE NOTCH COMPUTER PRODUCTS
DIVISION OF ICRTRAN INTERNATIONAL
4211 NW 75th TERRACE • DEPT 5 4 • LAUDERHILL FL 33319
PAT PEND ALL TRADEMARKS ARE ACKNOWLEDGED

CIRCLE 165 ON READER SERVICE CARD

$POWER
STOCKCRAFT
NEW
Stockmarket Program for Apples & Compatibles

Tax Strategy
Technical Analysis
Portfolio Management
Optimized Trading Strategy

$118.00 GET THE BEST ....AND PAY LESS!
Send '16 for Demo Disk
TAX DEDUCTIBLE
Call or send today for brochure!!

Decision Economics, Inc.
14 Old Farm Road, Dept.CC Cedar Knolls NJ 07927
(201) 539-6889

CIRCLE 126 ON READER SERVICE CARD

BEFORE YOU BUY ANOTHER PIECE OF SOFTWARE

CONSULT THIS BUYER'S GUIDE

Selecting the programs, systems and games for your personal computer can be an ordeal. You want the best package that's compatible with your system—*at the right price!*

LOOK NO FURTHER. THE OLYMPIC EDITION OF THE *CREATIVE COMPUTING 1984 SOFTWARE BUYER'S GUIDE* IS HERE!

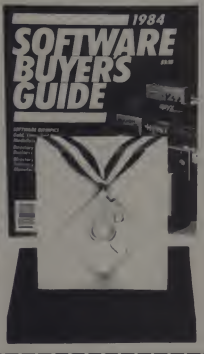
The Editors of CREATIVE COMPUTING have awarded the Olympic Gold, Silver and Bronze medals to the leading software packages in the following categories:

- Full-feature word processors
- Home word processors
- Education: Pre-school, Elementary and Secondary
- Spreadsheets
- Database packages
- Games

Full descriptions, product reviews and screen photos of each award winner make this the definitive guide to the leading software of 1984!

In addition to the Olympic Ratings Guide, you'll find:

- A complete directory of software products with full program descriptions, system requirements and prices, PLUS
- A full listing of software manufacturers, with names, addresses, types of software made and compatible hardware for each product!



If you own an Apple, Atari, Commodore 64, TRS-80 Color Computer, or any IBM PC, and you're in the market for new business, educational, personal productivity, recreational and utility programs, take the ordeal out of shopping...save money and get the best package for your system *at the best price!*

Order your copy of the CREATIVE COMPUTING 1984 SOFTWARE BUYER'S GUIDE today!

Also available at your local newsstand and computer store.

Creative Computing 1984

SOFTWARE BUYER'S GUIDE

CN 1914, Morristown, NJ 07960 MF1F

YES! I'm enclosing $4.95 ($3.95* plus $1 postage & handling) for the 1984 SOFTWARE BUYER'S GUIDE. (Outside USA $6.)

Mr. Mrs. Ms. _____
(please print full name)

Address _____

City State Zip _____

*Residents of CA, NJ and NY State add applicable sales tax.

creative computing CLASSIFIED

CLASSIFIED RATES: Per Word, 15 Word Minimum. **REGULAR:** $3.50. **EXPAND-AD™:** $5.25. Ads set in all bold type at 20% premium. Ads set with background screen @ 25% premium. **GENERAL INFORMATION:** Prepayment discounts available. Payment must accompany order except credit card—Am. Ex., Diners, MC, VISA (include exp. date)— or accredited ad agency insertions. Copy subject to publisher's approval; must be typewritten or printed. First word set in caps. Advertisers using P.O. Boxes MUST supply permanent address and telephone number. Orders not acknowledged. They will appear in next available issue after receipt. Closing date: 5th of the 3rd month preceding cover date (e.g., April issue closes Jan. 5th). Send order & remittance to: Classified Advertising, **CREATIVE COMPUTING** Magazine, 1 Park Avenue, New York, N.Y. 10016. To charge your ad to a major credit card, call Lois Price at (212) 503-5115. For Customer Service, call (212) 503-4506.

SOFTWARE

ATTENTION APPLE, IBM, Commodore, Atari, TI 99/4A users. Extensive selection of software. Send for catalog; specify model. Celjim Enterprises, 3887 Mexico, Westerville, Ohio, 43081. (614) 890-7725 after 4:30.

HORSE & DOG HANDICAPPING PROGRAMS FOR MOST PERSONAL COMPUTERS. Free Catalog: Gambler's Edge Computing, Dept B4, 250 Richards Rd., Ste. 254, Kansas City, MO 64116.

FOR TRS-80 MODELS 1/III/4-LAZYFONT creates and prints custom fonts with Epson or Prowriter printers; 8 free fonts with program. $49.95. 2-80 meth routine for $89.95. More information from AlphaBit Communications Inc., 13349 Michigen Ave. Dearborn, MI 48128. (313) 561-2898

COMMODORE 84/VIC 20 Games/educational software. Over 4000 titles! Write for FREE catalog! American Peripherals, 122 Bengor St., Lindenhurst, NY 11757.

Write for FREE 120 page catalog; DYNACOMP, P.O. Box 18129, Rochester, NY 14618. Stele computer.

FREE Commodore—84/TI99-4A/VIC-20/TRS80-coco/Timex programs! Send stamps! EZRAEZRA Company, Box 5222-RES, San Diego, California 92105.

FREE SOFTWARE. Earn "bonus bucks" for FREE software, books and supplies. Catalog ($1 refundable with order). Specify model. Computer Discount Center Inc., Dept. CC. P.O Box 1548, Springfield, VA 22151.

DRAGON 84/32, Software/Hardware Importers Adventure/Arcade Games, Utilities, Disk Drives. Free Catelog, Write pllc. 1272 Edgewood Drive, Vineland, NJ 08360.

TS-1000 TI99/4A, VIC-20 software Turn Programs Into Profits. FREE CATALOG. MIDWEST SOFTWARE, 9922 Herwich, Crestwood, MO 83128

INDEPENDENT SOFTWARE WANTED. Large royalties paid. Macintosh designs preferred. Contact. SOFTWARE TO GO, c/o Lawrence Roberts, 330 East 79 Street, New York, NY 10021

TI-99/4A. C-64. TIMEX 16K-48K. VIC. IBM owners. $ fun programs for $2.00! Gel Baseball. Etching-Sketch, Black-Jack, Dungeon. Galactic Patrol. Specify your computer. CHIPMUNK SOFTWARE. 634 Littlecroft, Upper-Darby, PA 19082

TI99/4A OWNERS. Affordable edventure and arcade games. FREE catelog. ORION SOFTWARE, 1149 Hurlon, Muskegon, Mich. 49445

TRS-80 Model 4-Play HEARTS card game with skilled computer opponents. Save scores. Diskette-$12.95. US only. BonJoEnterprises, 24228 Undine Rd., Valencia, CA 91355.

COMPUTER TRAINING through disks/tutorials, IBM, Apple, Senyo, etc. Hardware, Software, Work Stations. Ryte Dele, Box 210C, Mountein St., Heliburton, Ont. K0M1S0 Canada (705) 457-2774

HARNESS AND THOROUGHBRED RACING HANDICAPPING PACKAGE $31.95. Specify: Cessette, Diskette, Apple II+EC IBM PC, COMMODORE 64, Vic 20, Atari, TI-99/4A, TRS-80. FREE INFORMATION! SOFTWARE EXCHANGE. Box 5382 CC, West Bloomfield, Michigen 48033.

HARDWARE

48K APPLE COMPATIBLE computer; U.S. $380.00 and hundreds of programs. Details U.S. $1.00. Reliant, PO Box 33810, Sheungwang, Hong Kong.

BMC MODEL 20E, 84 color screen, printer, 10 Megebyte Hero and 458K SOFTDISK. All Software. Price $2,100.00. (312) 858-3195

KAYPRO, APPLE IIC, PANASONIC senior partner. Call or write for latest price. Discount Computer Accessories, 445 North Pine, Reedsburg, WI 53959. (608) 524-2429

COMPUTER EQUIPMENT/SUPPLIES

FREE catelog—full of the best computer accessories at the lowest prices. Write: TEMCC8, 10-12 Charles St, Glen Cove, NY 15442.

INTRODUCING "StaticTrap"! Stop body static before touching computers, circuit cards, etc. $29.95 chk., M.O. Full refund guaranteed! PENCO. Box 33185 Decatur, GA 30033

SANYO 550-1, Blow-out price—$818; 555-2, 360K—$1190; plus freight. Other Sanyo computers available. SMS Dist. Center, Box 1904, Fargo, ND 58107. Rebetable price sheet $5.00.

COMPUTER PUBLICATIONS

NEW SHOPPER'S GUIDE TO SAVINGS!!! Best Prices for over 400 microcomputer products from 250 eds researched monthly. Suppliers and ordering information included. Save or Money Back. Sand $5 to: AD*Ventege, Box 822-CB10, Pluckemin, NJ 07978

COMMODORE 64 software source. over 880 entries, listed by categories, $7.00 to M.S.C. PO Box 1039, Mt. Vernon, NY 10550.

BUSINESS OPPORTUNITIES

$3000.00 per month spare time income with your computer! Free details. Digetek Corporation, 2723 West Butler Drive, Suite B, Phoenix, AZ 85021.

MICROCOMPUTER BUSINESS ENTPERPRISES. Proven methods detailed. Free information. Ryte Dale, Box 210, Mountein St. Heliburton, Ont. K0M 1S0 CANADA

PERSONAL COMPUTER software publisher in nasd ol over 500 new copy-writed or uncopy-writed programs for laisura, lasrning, productivity, and performence. 70% Commodore, 10% Apple, 10% IBM; 10% Atari. Machine lenguege with good grephics, content, audio and play. Cesh or cesh with options. 1-(800) 822-7990, or Entertenment Concepts. 830 North Shore Drive, Kenses City, MO 84151.

MAIL ORDER OPPORTUNITY! Start profitable home business without experience or capitel. Information free. Mail Order Associates, Inc., Dept. 70, Monivele, NJ 07845

X-MAS $$$ with your Apple or C-64 others offer vague schemes; we offer a proven product: "A Christmas Advanture"—unique customized software gift. We sold thousends last Christmas. Now you can customize and sell copies with our Home Customization Package. Pure profit eller only 4 sold! Details and free pamphlet on cost-free marketing strategies. Bit Cards Inc., 30 West Service Rd., Champlain, NY 12919, or (514) 274-1103 (cell collect)

$380 WEEKLY/UP, MAILING CIRCULARS! No quotes. Sincerely interested, rush stamped envelope. Marketing International, Box 15987-CR10, San Diego, CA 92115.

FOR SALE/BARTER

LOWEST POSSIBLE PRICES ANYWHERE! Computer Hardwere—Software—Printers, Audio, Video, Cellular. ELECTRIFIED DISCOUNTERS, 998 Orenge Ave., West Heven, CT 06578 MC/VISA. (203) 937-0108.

TURNTABLE TOPS 18" x 24" in mice. Almond, welnut or bulcher block. $35.00 each. New Jersey residents add 6% seles tex. Make check payable to: The Kitchen Saver, Inc., 538 Buena Vista Road, Maple Shede, NJ 08052. (609) 779-1095.

FOR SALE BY OWNER. Listing of microcomputers and peripherels for sele by owner. IBM-PC, IBM-XT, Portable. Apple many others for complete listing send $28.00 to: JEGAL CORP., BOX 244, Wyckoff, New Jersey 07481

COMMODORE 64

THE CAR MAINTENANCE EXPENSE PROGRAM—Keep track of oil changes, etc. Add, Reed and Print by category and/or year. Supports up to 4 vehicles. On disk for Commodore 64. Send $15.95 to MIG Enterprise, PO Box 287, Old Chelsee Station, New York, NY 10113.

LASER STRIKE—Arcade typed-machine lenguage space action for the Commodore 64 Disk/Cassette $17.95. Isis Helfhor, 8184 Verdure Ave., Golete, CA 93117. CK/MC/VISA

CLASSIFIED ADVERTISING ORDER FORM

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15 (MINIMUM)
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30

Please refer to heading in first page of this section for ad placement information

REGULAR: $3.50 **EXPAND-AD™:** $5.25 (per word)

OF WORDS _____ # OF INSERTIONS _____

☐ PAYMENT ENCLOSED $ _____

☐ CHARGE You will be billed monthly ☐ American Express ☐ Diners ☐ Visa ☐ MasterCharge-Interbank #

Account # _____ Exp. Date _____

SIGNATURE _____

PRINT NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

creative computing's RETAIL ROSTER

A DIRECTORY OF STORES AND THE PRODUCTS THEY CARRY
TO PLACE A LISTING CALL COLLECT: LOIS PRICE (212) 503-5115

ARIZONA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals.

CALIFORNIA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers, Software, Peripherals. ANAHEIM—330 E. Ball Rd., (714) 776-9420. CAMPBELL—2350 S. Bascom Ave., (408) 377-9920. EL CERRITO—6000 Potrero Ave., (415) 236-8670. LA MESA—8383 Center Drive, (714) 461-0110. LOS ANGELES—2309 S. Flower St., (213) 749-0261. PO-MONA—1555 N. Orange Grove Ave., (714) 623-3543. REDWOOD CITY—2001 Middlefield Rd., (415) 365-8155. SACRAMENTO—1660 Fulton Ave., (916) 486-1575. WOODLAND HILLS—22504 Ventura Blvd., (213) 883-0531.

COLORADO

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. DENVER—5940 W 36th Ave., (303) 422-3406.

CONNECTICUT

EXECUTIVE SOFTWARE–Stamford–(203) 359-2604. Dedicated to excellence in microcomputers! Authorized dealer for KAYPRO & ALTOS.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. AVON—395 W. Main St. (Rt. 44). (203) 678-0323.

FLORIDA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. HIALEAH—4705 W. 16th Ave., (305) 623-2280. JACKSONVILLE—8262 Arlington Expressway, (904) 725-4554. PLANTATION—7173 W. Broward Blvd., (305) 791-7300. TAMPA—4109 Hillsborough Ave., (813) 886-2541. FT. LAUDERDALE—7173 W. Broward Blvd. (305) 791-7300.

GEORGIA

MENTOR TECHNOLOGY, 3957 Pleasantdale Road, Atlanta, 30340. (404) 447-5236. Televideo, Eagle, OSM, Prowriter, Morrow, Business Software. Multi-user specialists!

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. ATLANTA—5285 Roswell Rd., (404) 252-4341.

HAWAII

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. HONOLULU—98-1254 Kaahumanu St., Pearl City, (808) 487-0029.

ILLINOIS

LOMBARD–COMPLETE COMPUTING. 890 E. Roosevelt. (312) 620-0606. Kaypro, Eagle, Victor, Atari, Commodore 64, Great Software Selection! Service/Training.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. Chicago—3462-66 W Devon Ave., (312) 583-3920. DOWNERS GROVE—224 Ogden Ave., (312) 852-1304

INDIANA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. INDIANAPOLIS—2112 E. 62nd St., (317) 257-4321.

KANSAS

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. MISSION—5960 Lamar Ave., (913) 362-4466.

KENTUCKY

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. Louisville—12401 Shelbyville Road. (502) 245-7611.

LOUISIANA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals KENNER—1900 veterans. Memorial Hwy., (504) 467-5321.

MARYLAND

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. BALTIMORE—1713 E. Joppa Rd., (301) 661-4446. ROCKVILLE—5542 Nicholson Lane, (301) 881-5420.

MASSACHUSETTS

SCIENCE FANTASY BOOKSTORE 16 Eliot, Harvard Square, Cambridge, 02138. (617) 547-5917. Open 11-6. Apple, Atari, IBM, Commodore 64.

MICROCON COMPUTER & SOFTWARE center, Danvers. Wide selection of products and services for Apple, Atari, Color Computer, CP/M & MS DOS systems, and Commodore computers. Software, accessories, peripherals, books & magazines. (617) 777-6440.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. PEABODY—242 Andover St., (617) 531-9330. WELLESLEY—165 Worchester Ave., (617) 237-1510.

MICHIGAN

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. E. DETROIT—16149 E. Eight Mile Road, (313) 772-0416. FARMINGTON HILLS—29433 Orchard Lake Road, (313) 555-4171.

MINNESOTA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals, HOPKINS—101 Shady Oak Road (612) 938-6371 St. PAUL—1545 White Bear Ave. (612) 776-1211.

MISSOURI

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. ST. LOUIS—3794 McKelvey Road (314) 291-1850.

NEBRASKA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. OMAHA—9207 Maple St., (402) 391-2071.

NEW HAMPSHIRE

COMPUTER HUT of New England—101 Elm, Nashua, 03060. (603) 886-6317. Retail-Mailorder DISCOUNT HOUSE for all your personal computing needs.

NEW JERSEY

WAYNE SOFTWARE—1459 Route #23, Wayne 07470. (Across from Packanack Center) Books, Programs, Discount Prices! (201) 628-7316.

NEW YORK

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. AMHERST—3476 Sheridan Dr., (716) 835-3090. ROCHESTER—937 Jefferson Rd., (716) 424-2540. N. WHITE PLAINS—7 Reservoir Rd., (914) 761-7690. Jericho, L.I.—15 Jericho Turnpike, (516) 334-6161.

NORTH CAROLINA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. GREENSBORO—4620 W. Market St., (919) 299-5390.

OHIO

NORTH COAST COMPUTERS, 650 Dover Center, Bay Village 44140, 216-835-4345. 100 N. Main, Chagrin Falls. Apple, Lisa, Vector Graphics, Hewlett-Packard. (216) 247-2202.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. CINCINNATI—10133 Springfield Pike, Woodlawn, (513) 771-6850. CLEVELAND—26100 Chagrin Blvd., (216) 292-7553. COLUMBUS—2500 MORSE ROAD, (614) 475-7200. TOLEDO—46 S. Byrne Road, (419) 537-1667.

OKLAHOMA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. OKLAHOMA CITY—2727 Northwest Expressway (405) 946-7893.

PENNSYLVANIA

PERSONAL SOFTWARE, 146 Paoli Pike, Paoli, 19355. (215) 296-2726. Software Specialists. Custom Programs, Canned Programs and Peripherals.

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals PHILADELPHIA—8316 Roosevelt Ave., (215) 266-0160. FRAZER—630 Lancaster Pike, (Rt. 30), (215) 647-5555. PITTSBURGH—3462 Wm. Penn. Hwy., (412) 824-3564.

RHODE ISLAND

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. WARWICK—556 Greenwich Ave., (401) 736-5150.

TEXAS

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. DALLAS—2715 Ross Ave., (214) 826-4053. FORT WORTH—5825-A Green Oaks Road. (817) 737-6622. HOUSTON—1704 W. Loop N., (713) 688-5263. NORTH HOUSTON—5050 FM 1960 West (713) 583-1183. SAN ANTONIO—7111 Blanco Road, (512) 341-0676.

UTAH

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. MIDVALE—56 East 7200 South, (801) 566-4626.

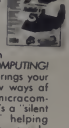
VIRGINIA

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. ALEXANDRIA—6201 Richmond Hwy., (703) 765-5515. VIRGINIA BEACH—1055 Independence Blvd., (804) 460-0997.

WASHINGTON

HEATHKIT ELECTRONIC CENTERS—Heath/Zenith Computers. Software, Peripherals. SEATTLE—505 6th Ave., North, (206) 682-2172. TUKWILA—15439 53rd Ave., South, (206) 246-5355. VANCOUVER—516 S.E. Chkalov Dr., (206) 254-4441.

RETAILERS TAKE NOTE!



Create an educated and aware customer with *CREATIVE COMPUTING!* Every issue brings your customer new ways of using their micracomputer PLUS it's a "silent salesperson, helping users select new peripherals, software and hardware. If you're interested in a low ticket item that's efficient, effective and profitable, call us today!! CALL 212-503-5380!

Or write:
Ziff-Davis
Publishing Company
Retail Sales Department
One Park Avenue
4th Floor
New York, NY 10016

the creative computer mart

SOFTWARE AND HARDWARE SHOPPERS GUIDE

Now available for the computer experimenter!

COMPUTER CONNOISSEUR'S DELIGHT!

NOW BE IN CONTROL WITH YOUR COMPUTER - THE ONLY PUBLICATION THAT TELLS YOU HOW TO EXPERIMENT WITH YOUR COMPUTER. LEARN THE VERSATILITY OF MODEM COMMUNICATIONS. CONDUCT EXPERIMENT WITH COMPUTER AND TELEPHONE SYSTEMS. HOW TO SET TIMER TO WHICH YOU HAVE A COMPUTER TELEPHONE ENGINEERING COURSE IS INCLUDED IN EVERY ISSUE, BUILD AND ATTACH YOUR OWN PERIPHERALS. EXPERIMENT WITH ROBOTICS AND HOME SWITCHING SYSTEMS. EXCLUSIVE INTERVIEWS WITH INDUSTRY LEADERS, INCLUDING TOM ENGLISH, CO-INVENTOR OF SCSI. THE MAGAZINE A MUST FOR EVERYONE INTERESTED

UNREPLACEABLE MATERIAL

Computel

PUBLISHED MONTHLY

ONE YEAR SUBSCRIPTION $14.00 (SAMPLE COPY $2.00)

SUBSCRIPTION & 2 PROGRAMS $20.00

Check Card Visa / MasterCard / COMPUTEL Subscription ESCROW Company 1-800-COMPUTEL (Call Card Only)

The one you've all been waiting for!

NOW AVAILABLE in Canada! Receive Computel monthly supplements with the magazine for you.

COMPUTEL—the complete SOURCE for everyone. You can now do the things you've only heard about, right in the privacy of your own home. Indispensable reference to phreaks and hackers. Learn how to get all kinds of computer goodies for FREE. Keep you informed on all business problems—their quirks and flaws and trends—to date with vital occurrences within the computer industry. Computel is a publication designed for everyone who has an intense curiosity of computer systems, containing a wealth of hard to find information, codes, and numbers. Published monthly

Computel Publishing Society

6354 VAN NUYS BL., #160-C/VAN NUYS, CA 91401

CIRCLE 312 ON READER SERVICE CARD

YOUR SEARCH IS OVER

For all your Computer Software, Hardware & Accessories

Great Service - Low Prices

Call 1-800-237-3500

In N.Y. State 212-246-0300

Call or write for our **FREE CATALOGUE**

GOREN COMPUTER

P.O. Box 366, Brooklyn, N.Y. 11229

CIRCLE 313 ON READER SERVICE CARD

VIDEO HIGH SCHOOL

CHEMISTRY I GAMES

APPLE II+, IIe, 48K

Six Games from MAZES to MATCHEMS includes FREE DISK on formula creation and metric conversion

RUTHMORE DESIGN CONSULTANTS

127 EAST 59th St. N.Y.C., N.Y. 10022

$37.95 N.Y. add sales tax

20 PROGRAMS on 2 cassette tapes

for 16K TS1000, TS1500, & ZX81 only $19.95.

*for TS2068, C-64, VIC-20, ATARI, TI99/4A, CoCo & MC-10 only $29.95

Save money, learn about the exciting world of home computing and have fun doing it with the new HOME-PAC™

The HOME-PAC™ with 21 page user manual covers educational, graphics, recreational, home finance and utility applications.

Great tool for learning to program in BASIC. Programs are listable and manual includes section on modification tips.

10 DAY MONEY BACK GUARANTEE

Please add $2.00 shipping and handling to order

Simplex Software, Dept CC2
82 Crestview Drive
Willingboro, NJ 08046
MC, VISA & Checks Accepted
Orders & Inquiries State Computer Type
Dealer Inquiries Invited

ICs PROMPT DELIVERY!!! SAME DAY SHIPPING (USUALLY)

64K DYNAMIC RAM ICs
200 ns **$4.87**, 150 ns **$4.87**

256K DYNAMIC RAMS
150 ns @ **$35.77**

Add 512K into XT or PPC @ $647!
With our proprietary information kit
(please indicate machine) to 640 Kbyte!
CONSUME 0 EXPANSION SLOTS!

SPECIAL: 64K 150 ns @ $4.44
CONDITIONS: (1) Please be within current price (2) Quantity: multiple of 20 (3) Shipping: Ship to one location, delivery 10 to 21 days (5) $10 shipping & handling (6) shipping insurance 30¢ per $100

We Sell Other Memory ICs.
6264, 2764, 27128, 27256, etc.

MasterCard/VISA or UPS CASH COD

Factory New, Prime Parts

MICROPROCESSORS UNLIMITED
24,000 South Peoria Ave. **(918) 267-4961**
BROKE OK 74012

Prices shown above are for July 15, 1934

Please call for more discount & current prices. Subject to change. Please expect higher prices on some parts due to world wide shortages. Shipping and insurance extra. Call for shipping charges to Alaska, Hawaii, APO, FPO. Orders received by 2:00 PM (Central) will be processed on the next morning. We Reserve Rights to Limit Quantities.

wabash

Flexible Diskettes

6 Year Warranty - 100% Certified

***FREE** UPS **DELIVERY**

5¼" SSSD	$1.35 each	BULK SSSD	$1.19 each
5¼" SSDD	$1.55 each	BULK SSDD	$1.38 each
5¼" DSDD	$1.89 each	BULK DSDD	$1.69 each

24 Hour Order Desk

TOLL FREE WATS **1-800-634-2248**

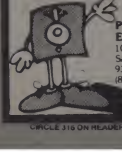
Visa, MasterCard, Cert chk., M/O, C.O.D. cash
Get immediate shipment. Schools & govt. on P.O.
Personal or company checks held 14 days.
APO, FPO Can. and other non-UPS delivered, add $5
*Free shipping on minimum orders of 400 in mono. Others add $7 to 4 in

Software Services

1326 25th St. S. Suite HD Fargo, ND 58103 **1-701-280-0121**

Dysan CORPORATION

Solve your disc problems, buy 100% surface tested Dysan diskettes. All orders shipped from stock, within 24 hours. Call toll FREE (800) 235-4137 for prices and information. Visa and Master Card accepted.



PACIFIC EXCHANGES
100 Foothill Blvd
San Luis Obispo CA
93401 (In Cal call
(805) 543-1037)

CIRCLE 316 ON READER SERVICE CARD

CAPTAIN MEGABYTE

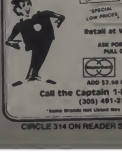
Now One Low Price.

THE CHOICE IS YOURS

*** ALL MAJOR BRANDS**

5S/DD $" $19.95
DS/DD $" $24.95

DISCOUNTS AVAILABLE IN 5", QUAD 3½" & BULK DISKETTES



SPECIAL LOW PRICES: Bulk Diskettes, Multi-Color Diskettes

Retail at Wholesale Prices

ASK FOR FREE CATALOG
FULL OF NEW ITEMS

COD's ACCEPTED

ADD $3.95 HANDLING PER CASE

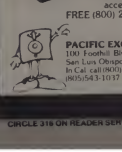
Call the Captain 1-800-327-1013
(305) 491-2300

* Some Brands Not Listed Are Slightly Higher!

CIRCLE 314 ON READER SERVICE CARD

Maxell Floppy Disks

The Mini-Disks with maximum quality.



Dealer inquiries invited C.O.D's accepted Call FREE (800) 235-4137

PACIFIC EXCHANGES
100 Foothill Blvd., San Luis
San Luis Obispo, CA 93401
In Cal. call (800) 592-5935 or
(805) 543-1037

CIRCLE 315 ON READER SERVICE CARD

Best Prices On TRS-80 Computers

Our 6th year of discounts
Ed or Joe McManus
Fgt. Prepaid. Save Tax.
Toll Free 800-231-3680
Marymac Industries, Inc.
22511 Katy Fwy., Katy (Houston) Tx 77450
1-713-392-0747
Telex 774132

See us in the Wall Street Journal every Tues., Wed., Thurs.

CIRCLE 308 ON READER SERVICE CARD

★MICROCOMPUTER★
BUSINESS SOFTWARE

MEDICAL MGMT...
DENTAL MGMT...
INSURANCE AGENT
LEGAL BILLING.....
PROPERTY MGMT..
AND MUCH MORE !

UNIVAIR INTERNATIONAL
9024 St. Charles Rock Road
ST. LOUIS, MISSOURI 63114
(314) 426-1099

IBM	TANDON
½ HEIGHT DISK DRIVES	TM 100-2 5¼" Disk Drives
$189.00	$209.00

• Shugart SA455 DS/DD 360 KB or Matsushita (same drive)

APPLE
COMPATIBLE 5¼ DISK DRIVES
$189.00

• Utilizes Shugart SA390 Mechanism full one year replacement warranty

CALL TOLL FREE
1-800-227-3800 ext 456
for orders only

FOR INFO OR TECHNICAL ASSISTANCE
404-956-0903

WE SHIP C.O.D., CASHIER CHECK, OR MONEY ORDER. VISA, MASTER CARD ADD 4%

BULLDOG COMPUTER PRODUCTS
100 GALLERIA PKWY, STE 400
ATLANTA, GA 30339

CIRCLE 316 ON READER SERVICE CARD

Sure it's insured?

SAFEWARE™ Insurance provides full replacement of hardware, media and purchased software. As little as $35/yr covers:
• Fire • Theft • Power Surges
• Earthquake • Water Damage • Auto Accident

For information or immediate coverage call:
1-800-848-3469
In Ohio call (614) 262-0559

SAFEWARE

SAFEWARE, THE INSURANCE AGENCY INC.

Educational Programs for —
ATARI, VIC 20, TI 99/4A
TRS 80 Color Computer
Apple II+ Commodore 64
only **$9.00** per cassette

Alphabet, Physics, Algebra, Weather, Planetary Positions and many others.

Now! Offering, also
SAT Preparation
(5 cassettes)

Write for free list:
MOSES ENGINEERING
P.O. Box 11038
Huntsville, Al 35805
Telephone (205) 837-3356

TAPE WORLD

1-800-245-6000

maxell. Dysan

MD-1 . . . 5¼", $580	18.95	104/1D . . 5¼", $800	21.95
MD-2D . . 5¼", $600	29.95	104/2D . . 5¼", $600	30.95
FD-1 . . . 8", $800	29.95	3740/1D . 8", $800	31.95
FD-2 . . . 8", $600	36.95	3740/2D . 8", $600	37.95

BASF		SCOTCH	
5¼", $800	19.95	5¼", $800	19.95
5¼", $600	29.95	5¼", $600	29.95

VERBATIM		ELEPHANT	
5¼", $800	19.95	5¼", $800	19.95
5¼", $600	29.95	5¼", $600	29.95

WE WILL BEAT ANY PRICE!
Prices per case of 10. Shipping 3.75 any size order
Pre-paid, COD, or credit card. COD add 1.65
ALL ORDERS SHIPPED WITHIN 48 HOURS.
Also, TDK and Maxell audio and video cassettes.

220 SPRING ST. BUTLER, PA 16001
412-283-0621 M-F 8:30-5:00

Scotch Diskettes

Rely on Scotch® diskettes to keep your valuable data safe. Dependable Scotch diskettes are tested and guaranteed error-free. The low abrasivity saves your read/write heads. They're compatible with most disk drive drives.

(800)235-4137

Dealer inquiries invited

PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA 93401 In Cal. Call (805) 592-5935 or (800) 543-1037.

CIRCLE 316 ON READER SERVICE CARD

ONLY $19.95

Self-Centering
Full X-Y Coordinate Control
360° Corser Control
2 Firing Buttons

THE AMPOTRONIC SELF-CENTERING JOY STICK FOR APPLE COMPUTERS

Z-80 Card	$75.00
80 Column Card	$75.00
16K RAM Card	$45.00
Fan for Apple, 2 Power Outlets	$40.00
RF Module	$12.00
Computer Paper 15#, 3300 sheets 9½"x11"	$26.95/box
Diskettes	Call
Diskettes, SSDD, Generic, 10 Disks in Library Case	$22.50/Case

Include $2.50 min. for shipping/handling.
NY State residents add sales tax.
Send check or money order to
AMPOC ENTERPRISES INC.
5 BEEKMAN ST SUITE 720, NY 10038
(212) 233-1780
Dealer inquiries welcome

Verbatim
flexible disks

Call Free **(800) 235-4137** for prices and information. Dealer inquiries invited. C.O.D. and charge cards accepted.

VISA

PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA 93401. In Cal. call (800) 592-5935 or (805) 543-1037.

CIRCLE 316 ON READER SERVICE CARD

Index To Advertisers

Reader Service No.	Advertiser	Page
206	Aardvark	172
*	Alf	37
*	Allenbach	164
102	Alpha Delta Communications	134
*	Apple Computer	50, 51
104	Art Sci	48, 49
107	BASF	78
110	Baeyla Brothers	155
105	Borland	1
106	Borland	27
112	CBS Software	68
*	Commodore	183
111	Compuserve	90
109	Compuserve	163
113	Computel Publishing Society	186
114	Computer Discount Products	149
115	Computer Mail Order	156, 157
208	Computer Power Solutions	15
207	Compuview	144
116	Conroy La-Point	98, 99
117	Cosmic	132
118	Cosmos	173
120	CPAids	143
119	Cyberlynx	94
122	Date South	160
124	Davidson + Assoc	21
126	Decision Economics	194
127	Dennison Computer Supplies	9
128	Designware	138
129	Disc Washer	130
130	Disc World	148
133	Doubleday & Company	16
132	Doubleday & Company	101
135	Electronic Arts	84
108	Electronic Specialists	188
141	Epyx	55

Reader Service No.	Advertiser	Page
138	Epyx	57
139	Epyx	59
142	Fliptrack	2
143	General Electric	32, 33
140	Harcourt, Brace + Jovanovch	48
145	Hayes	88, 89
146	Hayes	152, 153
125	Health	Cov 4
148	Human Edga Software (HES)	75
150	IBM	38, 39
149	IBM	136, 137
147	Infocom	168, 169
152	Inkwell Systems	181
169	Inmac	81
151	International Computer Bank	192
153	Janus Dysc Company	93
131	Kensington Microwave	97
212	Krell	129
155	Learning Company	7
156	Learning Well	101
159	Lyco Computing	174, 175
136	Mannasmann-Tally	41
157	Meca	135
158	Megahaus	17
160	Micro Mail	166
194	Micro Sci	112
173	Mindscape	53
209	MultiTech Sytems	190
*	National Education Corp	81
190	NEC	170
165	Nibblenotch	193
166	Nonagon	95
*	NRI Schools	103
167	Okidata	159
188	Olympus Software	188
170	Opposiunities for Learning	26

Reader Service No.	Advertiser	Page
161	Precision Data Products	75
175	Precision Software	13
171	Professional Handicapping	186
172	Promatheus	77
211	Promatheus	179
177	Protecto	43
178	Qantex	5
179	Quark	11
174	Quinsept	192
181	Radio Shack	44, 45
191	Random House Software	74
184	Rising Star Tec	23
164	Satelite Software	83
187	Scarborough Systems	28, 29
182	Scarborough Systems	31
188	Scholastic Software	71
189	Scott, Forasman	65
183	Sensible Software	61
192	Sir-tech Software	Cov 3
185	Smart Data	101
186	Smart Data	186
193	SMC Thoroughbred Software	72, 73
162	Sublogic	154
196	Systems Management Assoc	107
195	Systems Management Assoc	185
205	Tecmar	Cov 2
197	Tarrapin	25
199	Transend	146
198	Trippe Lite	162
200	U.S. Robotics	151
144	Xerox/Business Systems Group	18, 19
203	Xerox/Weekly Reader	35
204	Xerox/Weekly Reader	67
201	Wadsworth	188
202	Walden Books	87

Coming Attractions

November

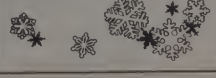
You have been waiting for this for ten years: the incredible tenth anniversary issue of *Creative Computing*. Here is the history and future of personal computing told by the people who made history and who will make the future. An all-star cast of 50 movers and shakers tells you the story from the inside. People like Scott Adams, Rodnay Zaks, Adam Osborne, Peter McWilliams, Carl Helmers, Don Estridge, George Morrow, Clive Sinclair, Seymour Papert, Gordon Bell, John Kemeny, Bill Godbout, and 38 others.

If you are not a subscriber, send in your card today. This one is sure to be a sellout the day it hits the newsstands.

December

As we barrel forward, this is the month we pause for a second and look back at 1984 and forward to 1985. We will publish our selections for the ten best computers on the market in ten size/price categories, and we will also make our predictions on what will be coming out in 1985.

Our special section will focus on word processing packages—what to look for and getting the most out of a package. Be with us then!

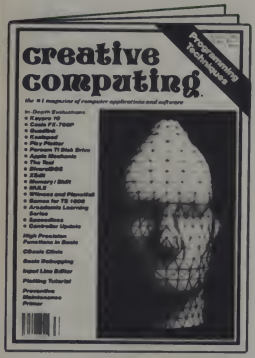


January

As we start our second decade in earnest, our theme is Technology Today and Tommorrow. Submicron particles, superconductivity, miniaturization, and other futuristic technologies will be explained and examined in depth. Learn what the pioneers in these fields are doing and what impact their work will have on your life.

The special insert section for January will focus on software for forecasting. Barry Keating will discuss what can and cannot be forecast by computer, what programs are available, and how well those programs perform.

FREE
INFORMATION SERVICE

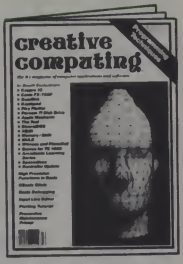


FREE INFORMATION! QUESTIONS ANSWERED! LATEST DATA!

Here's your chance to learn more about any number of products and services described or advertised in this month's *Creative Computing*. *FREE OF CHARGE!*

Directions on reverse side.

FREE INFORMATION SERVICE



Free! Quick! No Obligation!

Let us forward your request for further information you'd like to receive on any number of products or services mentioned or advertised in this month's issue of *Creative Computing*. No charge or obligation! *And as easy as 1-2-3!*

1 Clearly print/type your name/complete address on *one* of the attached reply cards.

2 Circle the number(s) on that card which correspond to the number(s) you'll find at the bottom of the ad(s)/article(s) about which you'd like to learn more. (You'll also find these key numbers on advertised products in this month's Advertiser's Index.)

3 Stamp and mail the card. The sooner it's sent, the quicker you'll get the literature you're after.

This is an ideal time to subscribe to *Creative Computing*—the #1 magazine of computer applications and software—and save 20%. One year, 12 issues, is just $19.97. (It's usually $24.97.) Just check the box at the bottom of the reply card...and make certain we have your complete present address.

creative computing

Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 12 months.

	1 *Own*	2 *Plan to Buy*
Apple	A	L
Atari	B	M
Commodore/PET	C	N
Digital Equipment/DEC	D	O
Heath/Zenith	E	P
IBM	F	Q
Radio Shack/Tandy TRS-80	G	R
Texas Instruments	H	S
Timex Sinclair	I	T
Other (specify)	J	U
None	K	V

3 For what, if any, business application(s) do you use the microcomputer you currently own?_____

4 ☐ **Please send me 12 Issues of *Creative Computing* for $19.97 and bill me. (Full 1 year subscription price $24.97.)**

Void after December 31, 1984

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225
226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275
276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325
326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350
351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375
376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425
426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450
451 452 453 454 455 456 457 458 459 460 461 462 463 484 485 486 487 488 489 470 471 472 473 474 475
476 477 478 479 480 481 462 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500

PLEASE PRINT CLEARLY—Use only one card per person

NAME_____ PHONE # ( )_____

COMPANY_____ TITLE_____

ADDRESS_____ APT._____

CITY_____ STATE_____ ZIP_____

(Zip code must be included to insure delivery) CC10843

creative computing

Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 12 months.

	1 *Own*	2 *Plan to Buy*
Apple	A	L
Atari	B	M
Commodore/PET	C	N
Digital Equipment/DEC	D	O
Heath/Zenith	E	P
IBM	F	O
Radio Shack/Tandy TRS-80	G	R
Texas Instruments	H	S
Timex Sinclair	I	T
Other (specify)	J	U
None	K	V

3 For what, if any, business application(s) do you use the microcomputer you currently own?_____

4 ☐ **Please send me 12 Issues of *Creative Computing* for $19.97 and bill me. (Full 1 year subscription price $24.97.)**

Void after December 31, 1984

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225
226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275
276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325
326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350
351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375
376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425
426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450
451 452 453 454 455 456 457 458 459 460 461 462 463 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500

PLEASE PRINT CLEARLY—Use only one card per person

NAME_____ PHONE # ( )_____

COMPANY_____ TITLE_____

ADDRESS_____ APT._____

CITY_____ STATE_____ ZIP_____

(Zip code must be included to insure delivery) CC10842

creative computing

Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 12 months.

	1 *Own*	2 *Plan to Buy*
Apple	A	L
Atari	B	M
Commodore/PET	C	N
Digital Equipment/DEC	D	O
Heath/Zenith	E	P
IBM	F	Q
Radio Shack/Tandy TRS-80	G	R
Texas Instruments	H	S
Timex Sinclair	I	T
Other (specify)	J	U
None	K	V

3 For what, if any, business application(s) do you use the microcomputer you currently own?_____

4 ☐ **Please send me 12 Issues of *Creative Computing* for $19.97 and bill me. (Full 1 year subscription price $24.97.)**

Void after December 31, 1984

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175
176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225
226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275
276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325
326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350
351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375
376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425
426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450
451 452 453 454 455 456 457 458 459 460 461 462 463 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500

PLEASE PRINT CLEARLY—Use only one card per person

NAME_____ PHONE # ( )_____

COMPANY_____ TITLE_____

ADDRESS_____ APT._____

CITY_____ STATE_____ ZIP_____

(Zip code must be included to insure delivery) CC10841

PUT STAMP HERE
THE POST OFFICE
WILL NOT DELIVER
MAIL WITHOUT
POSTAGE

creative computing
P.O. Box 13010
PHILADELPHIA, PA 19101

PUT STAMP HERE
THE POST OFFICE
WILL NOT DELIVER
MAIL WITHOUT
POSTAGE

creative computing
P.O. Box 13010
PHILADELPHIA, PA 19101

PUT STAMP HERE
THE POST OFFICE
WILL NOT DELIVER
MAIL WITHOUT
POSTAGE

creative computing
P.O. Box 13010
PHILADELPHIA, PA 19101

COMMITTED TO EXCELLENCE:

OUR COMMITMENT IS YOUR GUARANTEE OF SOFTWARE THAT CHALLENGES, ENTERTAINS, AND INTRIGUES!

The WIZARDRY Phenomenon Continues!

Now, better than ever, the Wizardry adventure continues with LEGACY OF LLYLGAMYN. Cast spells, work your way through a 3-D maze and enjoy the thrill of Wizardry with our newest software innovation--WINDO-WIZARDRY™. Its Lisa-like windows help you play faster and more efficiently than ever before! All the information you'll ever need is at your fingertips' command. SOFTALK's Review Editor, Roe Adams, calls LOL "...an excellent game! It's a landmark in graphics advancement." LEGACY OF LLYLGAMYN is a new world of excitement!

"The Best Yet!"

Margot Comstock Tommervik, Editor, SOFTALK

SIR-TECH SOFTWARE INC.

Apple is a registered trademark of Apple Computer, Inc. SIR-TECH SOFTWARE INC., 6 MAIN STREET, OGDENSBURG, NY 13669. (315) 393-6633

ALL SOFTWARE AVAILABLE FOR THE APPLE AT YOUR FAVORITE RETAILER.

CIRCLE 192 ON READER SERVICE CARD

Build your own IBM PC compatible and save hundreds of dollars.

Heath proudly announces the NEW HS-151 Desktop and HS-161 Portable computers.

One of the world's largest software libraries has IBM's name on it. Now you can run that software on Heath's new IBM PC compatible computers, available in easy-to-build kits.

Can you build one of these computers? 85% of our first-time customers ask the same question. And the answer is 100% yes. You can.

In fact, you *should* build one. You'll save a lot of money while learning about computers in general and the Heath PC's in particular.

Build confidence...and your new computer...one step at a time. Two main circuit boards come to you pre-assembled and factory-tested. So that you can build the three other boards, we include a test soldering board plus helpful soldering instructions to make sure you get it right.

Our instruction manuals are easy to understand, thorough and packed with cogent illustrations. And once it's built, the computer guides you through a full range of included disk-based diagnostics.

Expert advice is only a phone call away, should you need it. You'll reach a trained consultant whose specialty is talking sense...not jargon.

We'll do whatever's necessary to make our pledge come true: "We Won't Let You Fail." Our entire business depends on that simple promise.

Experience a little wonder and a lot of pride. Save money, too, by building the highest quality personal computer. The Heath PC's have 128K RAM standard (expandable to 640K); a professional keyboard, dual 360K disk drives and optional Winchester. These machines are truly complete. Both are color capable and MS*-DOS is included.

Check out the Heath PC computers today. IBM compatibility means they'll run the most popular software. And, with the money saved by building a kit, think of all the peripherals and software you can buy!

CIRCLE READER SERVICE CARD. Get more information on the most rewarding personal computers. The HS-151 Desktop PC and HS-161 Portable PC.

*MS is a registered trademark of Microsoft Corporation

For computing on the go... the HS-161 Portable.

The HS-161 has the same features as the HS-151. Amber Monitor included. Convenient keyboard folds up, two disk drives fold down.

HS-151 Desktop PC with standard floppy disk drive or optional hard disk.

Heathkit®
Heath Company®

A subsidiary of Zenith Radio Corporation

CIRCLE 125 ON READER SERVICE CARD

CP-230